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Figure 6.10  
Annual growth rate of China's population, 1964-2050

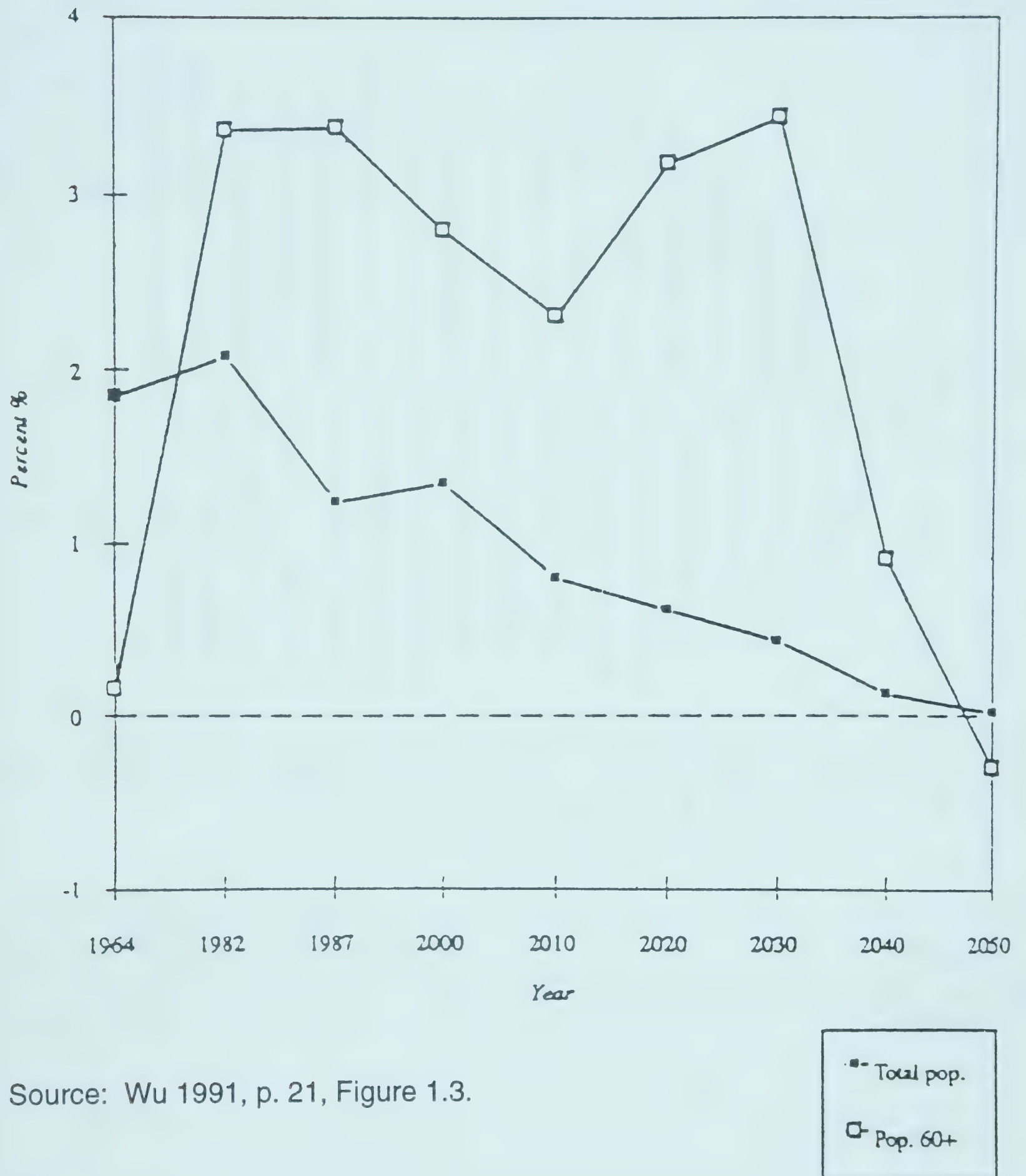
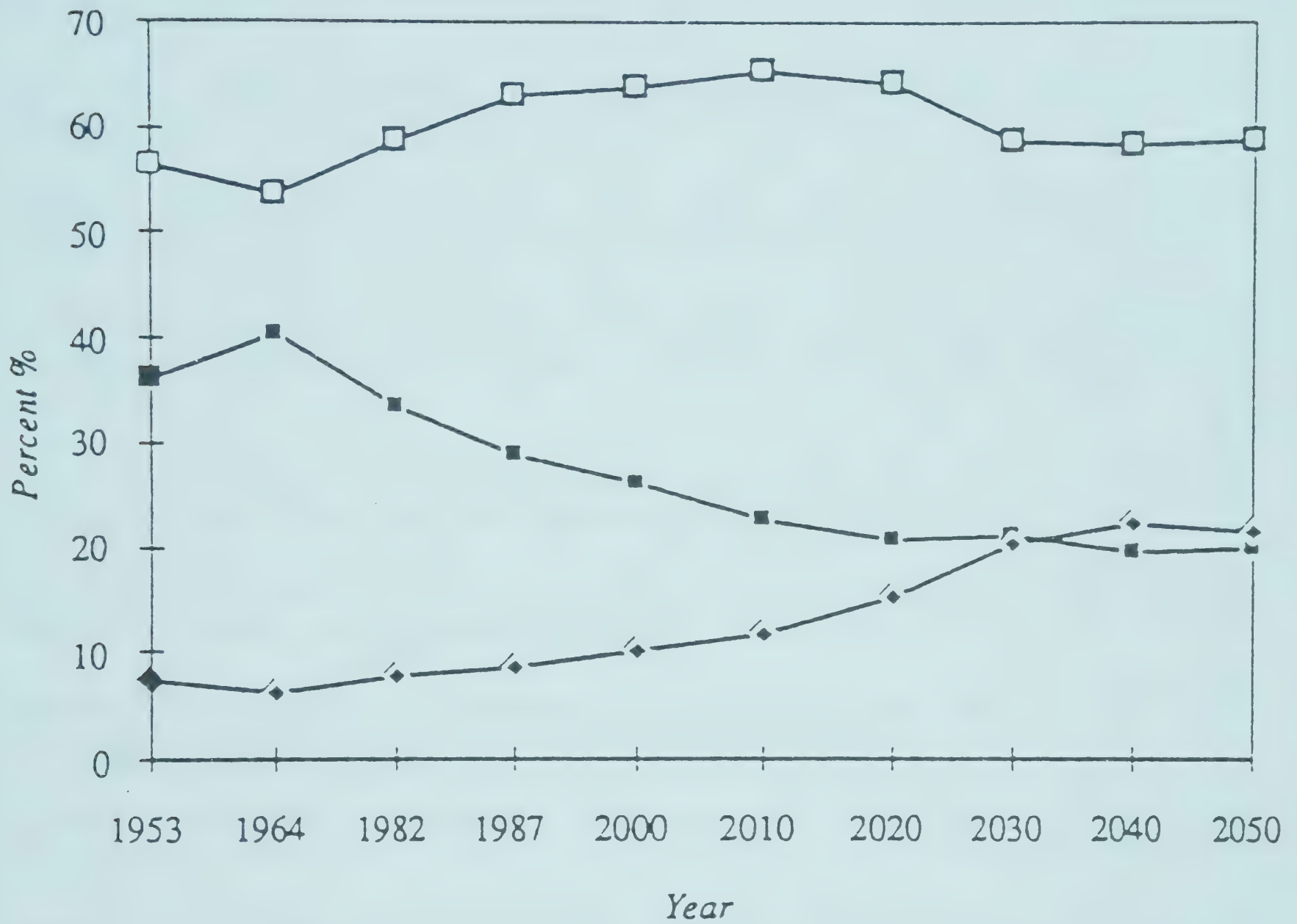


Figure 6.9  
Age distribution for China, 1953-2050



Source: Wu 1991, p. 28, Figure 2.1.

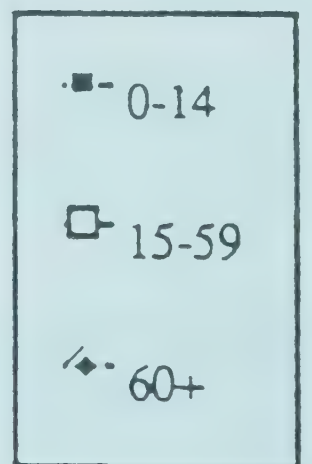
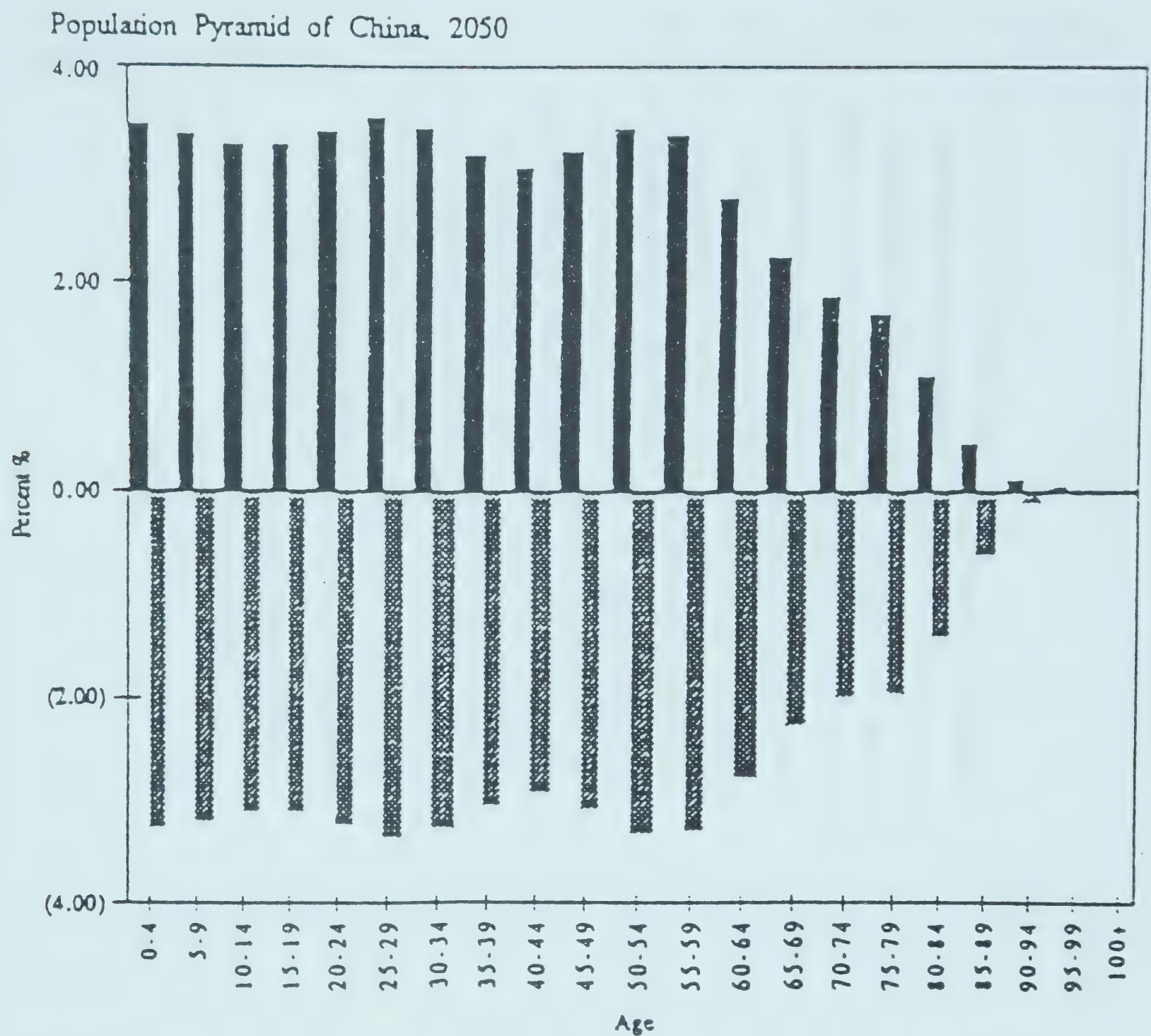


Figure 6.8



Source: *Population Projection for China*, Naohiro Ogawa, et al.,  
 UNFPA Assisted Project: CPR/85/P54  
 "Development of Research on the Aged for Policy Making Purposes",  
 Research Report No. 1, JOICFP

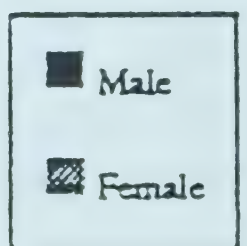
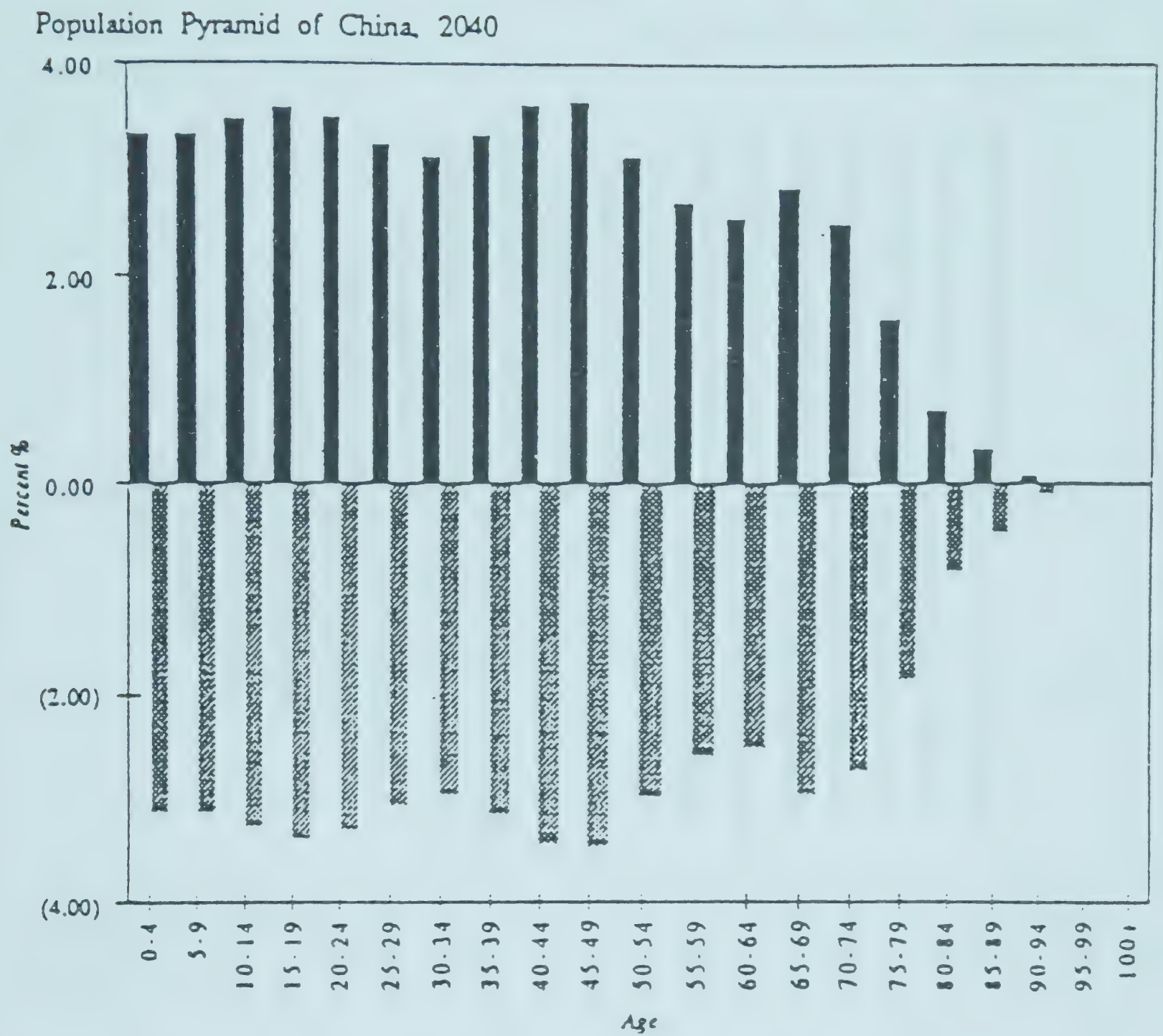


Figure 6.7



Source: *Population Projection for China*, Naohiro Ogawa, et al.,  
 UNFPA Assisted Project: CPR/85/P54  
 "Development of Research on the Aged for Policy Making Purposes".  
 Research Report No. 1. JOICFP

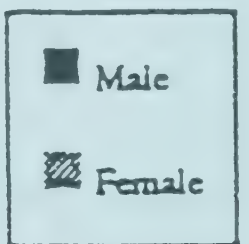
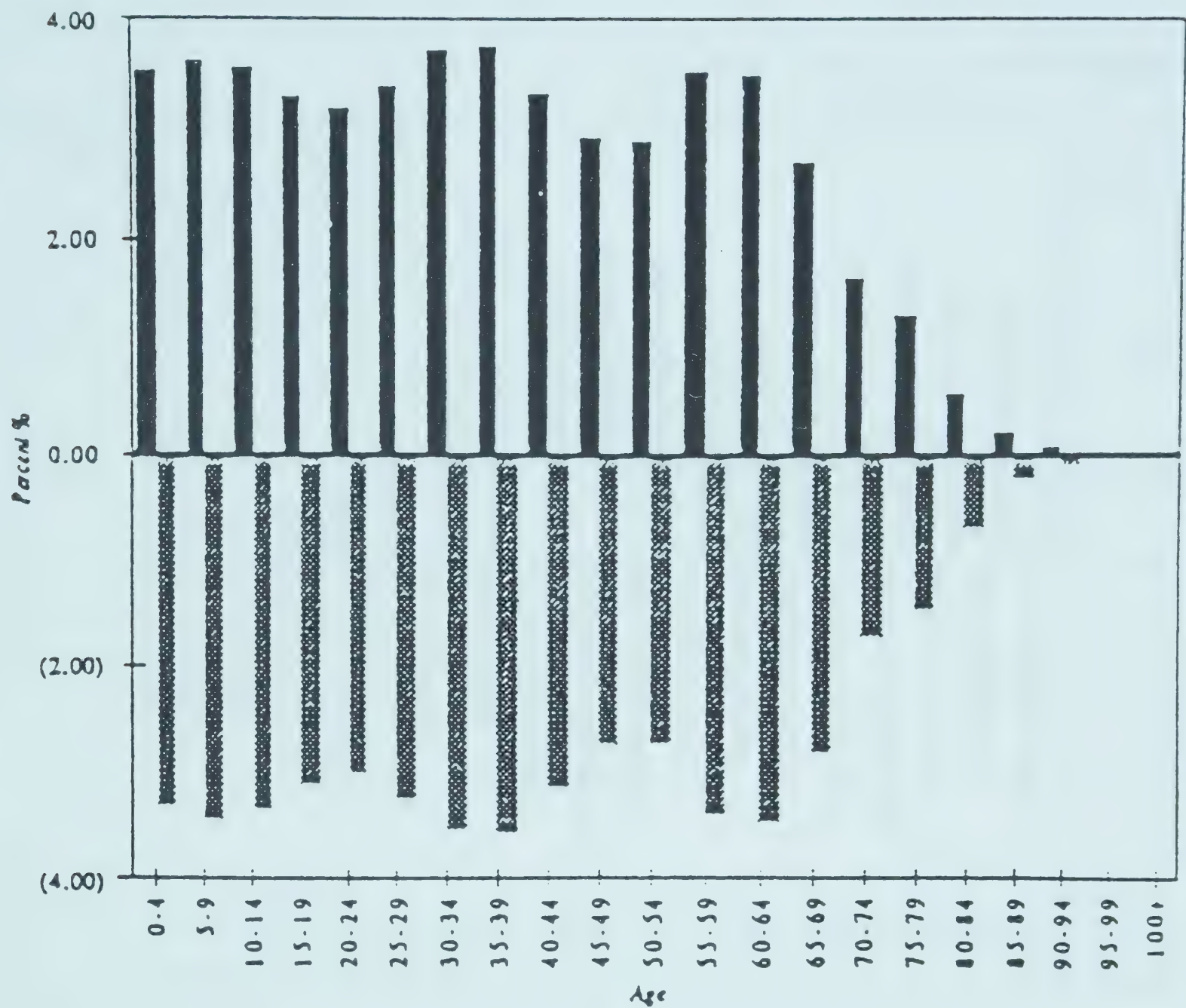


Figure 6.6

Population Pyramid of China 2030



Source: *Population Projection for China*, Naohiro Ogawa, et al.  
UNFPA Assisted Project CPR/85/P54  
"Development of Research on the Aged for Policy Making Purposes".  
Research Report No. 1, JOICFP

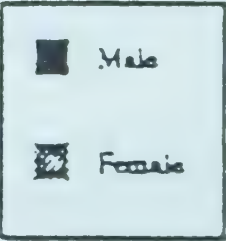
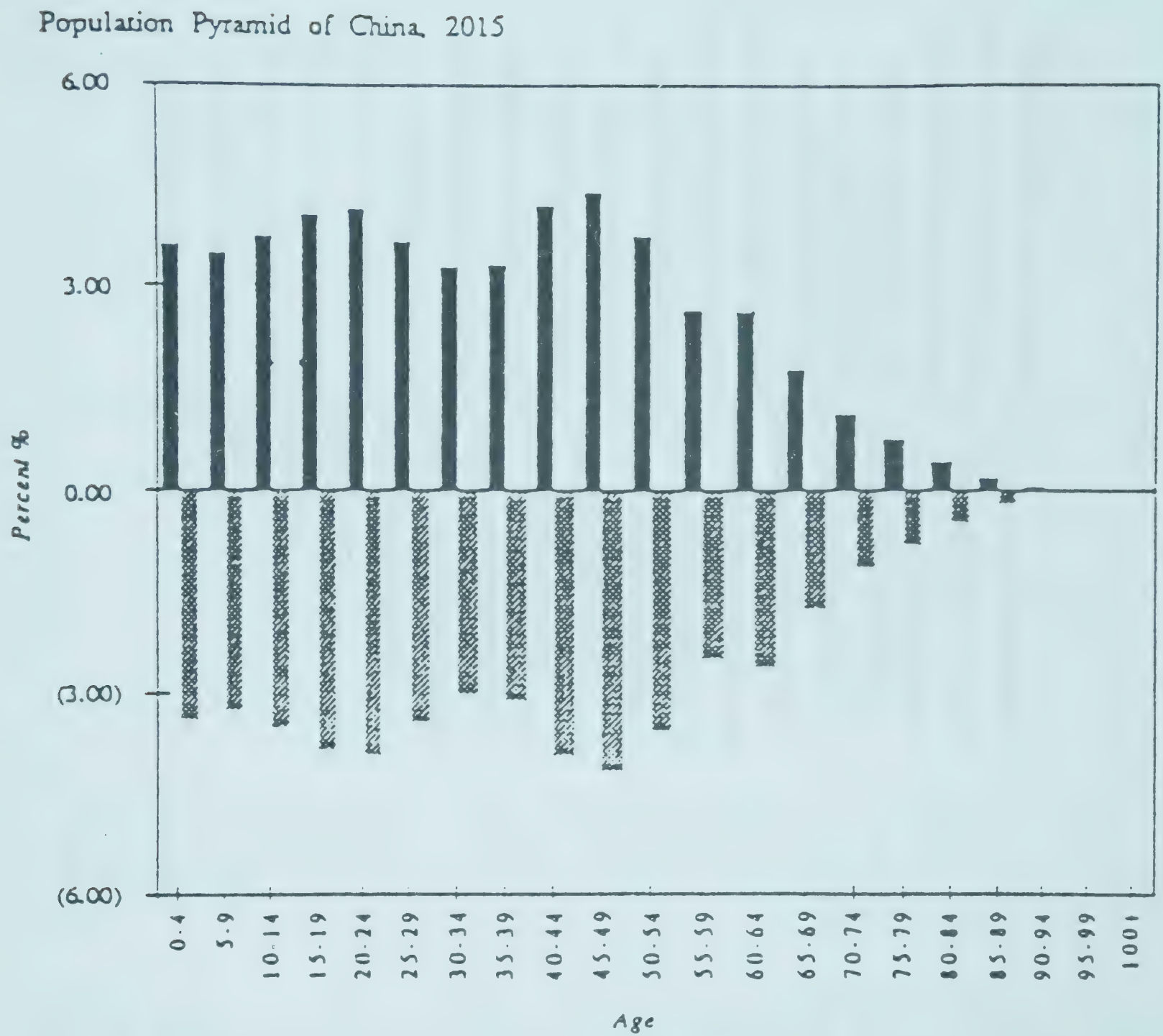


Figure 6.5



Source: *Population Projection for China*, Naohiro Ogawa, et al.,  
 UNFPA Assisted Project: CPR/85/P54  
 "Development of Research on the Aged for Policy Making Purposes",  
 Research Report No. 1, JOICFP

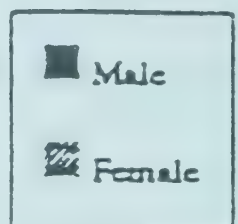
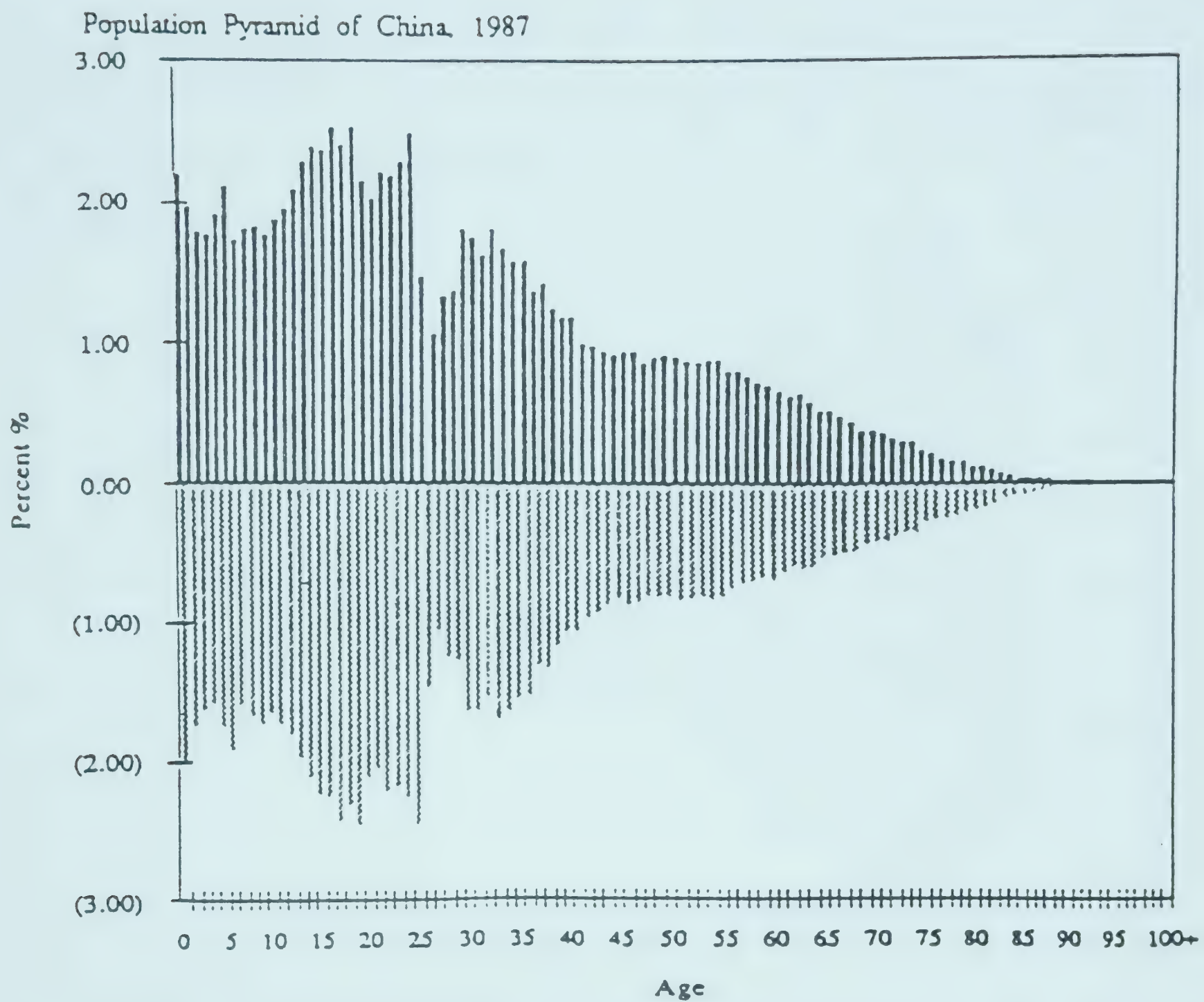
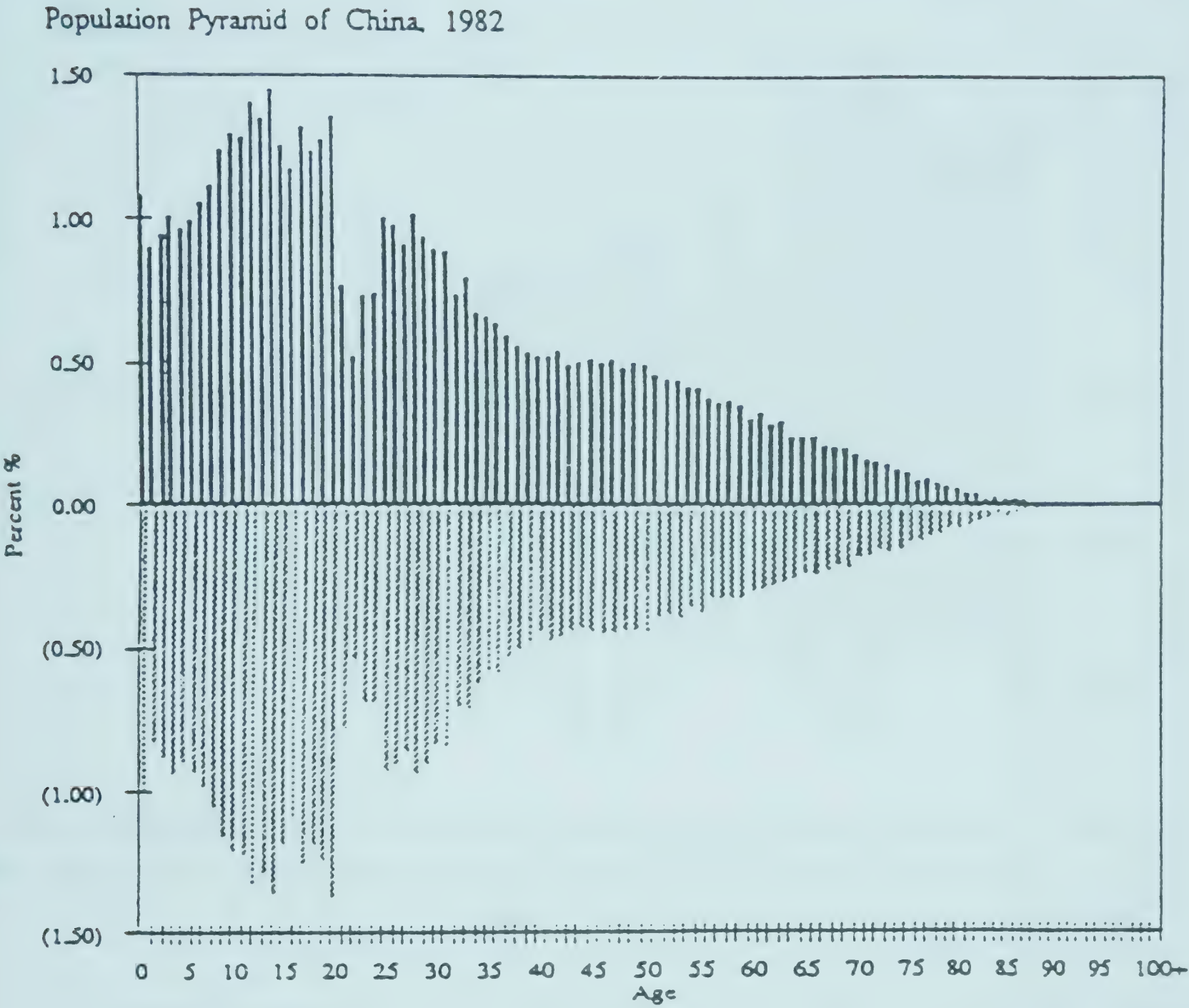


Figure 6.4



Source: *Tabulations of China 1% Population Sample Survey (National Volume)*  
 Department of Population Statistics  
 State Statistical Bureau

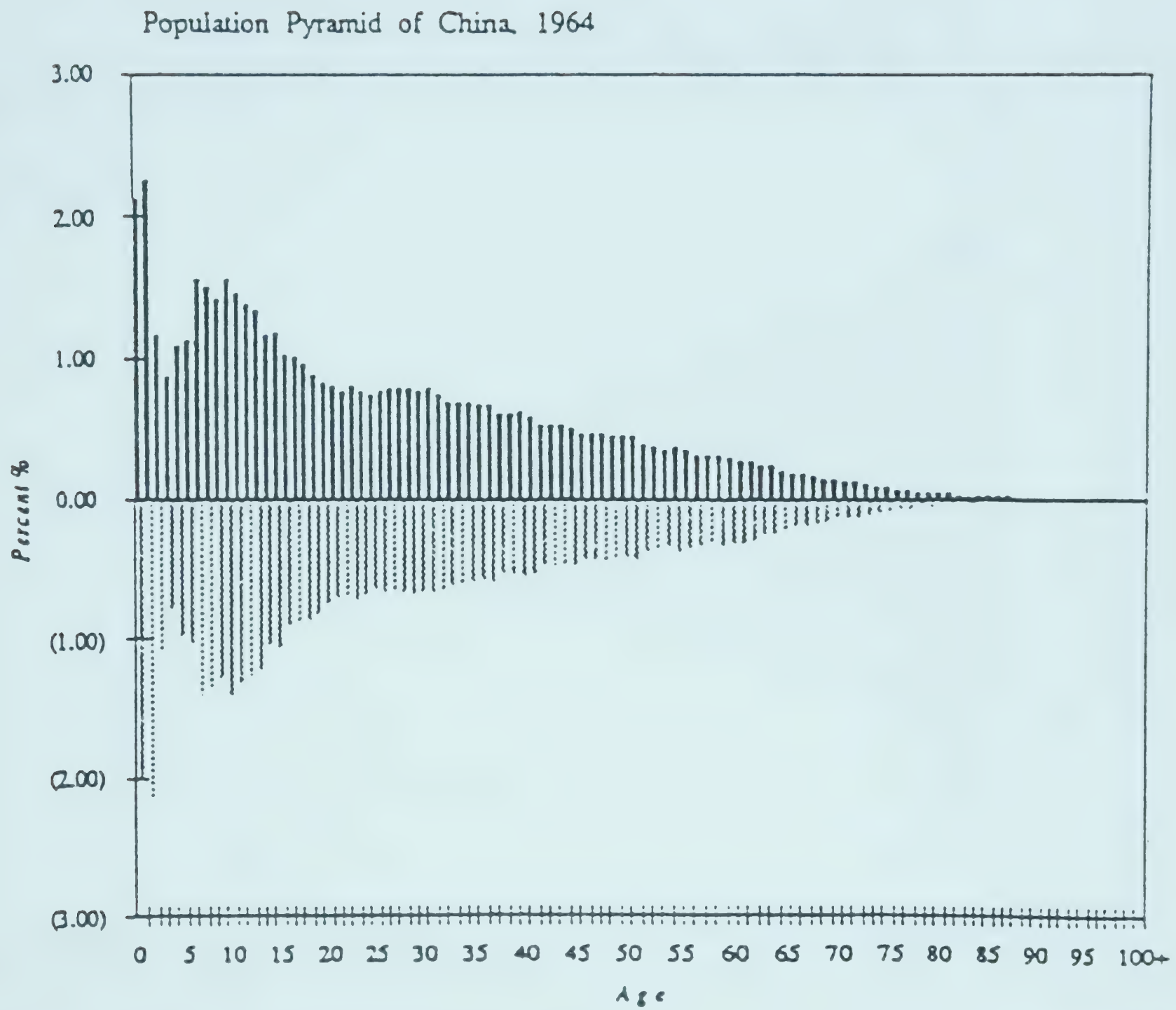
Figure 6.3



Source: *Almanac of China's Population, 1985*  
Population Research Center, CASS  
Chinese Social Sciences Publishing House



Figure 6.2



Source: *Almanac of China's Population, 1985*  
Population Research Center, CASS  
Chinese Social Sciences Publishing House

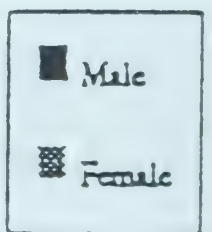
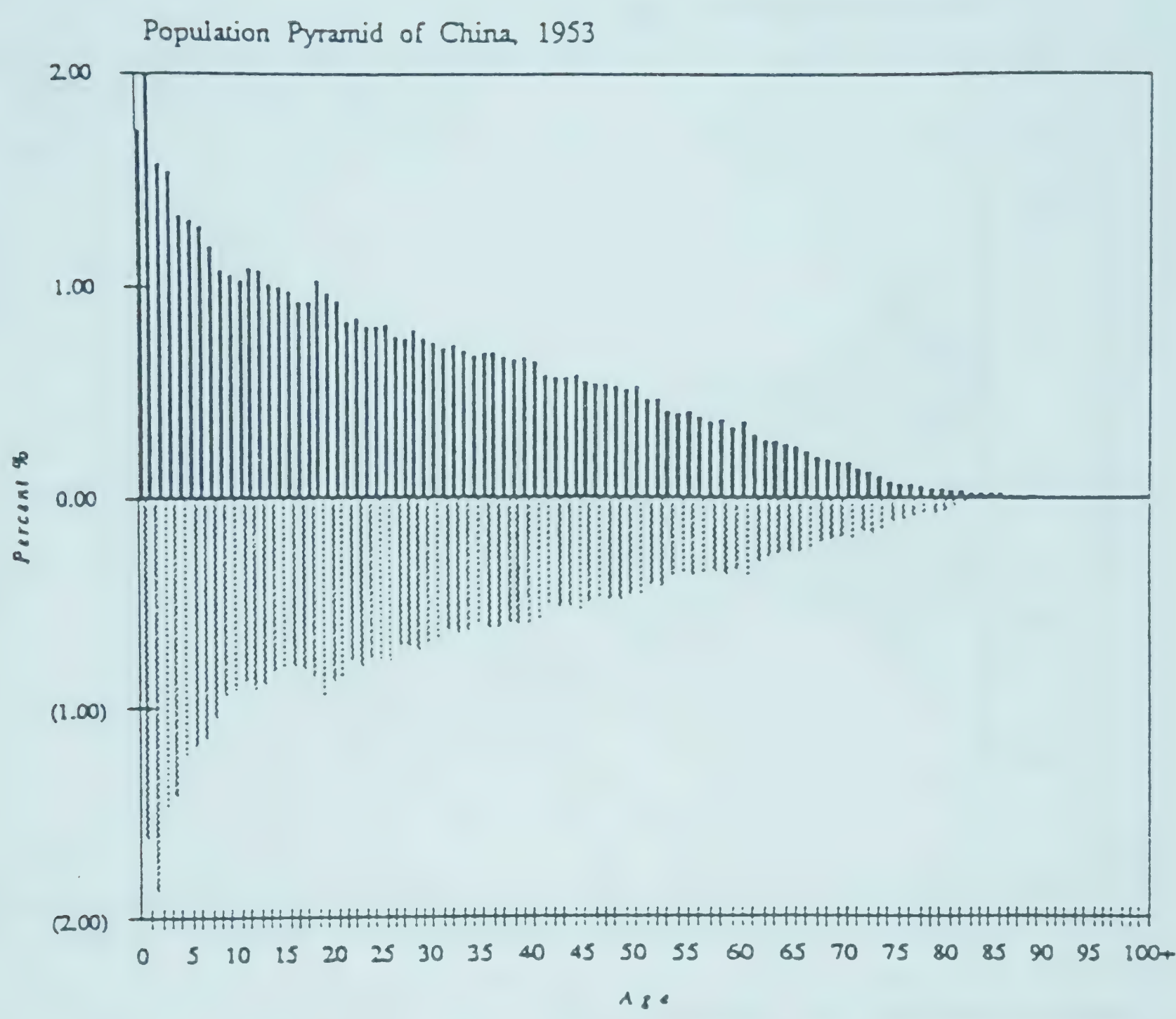


Figure 6.1



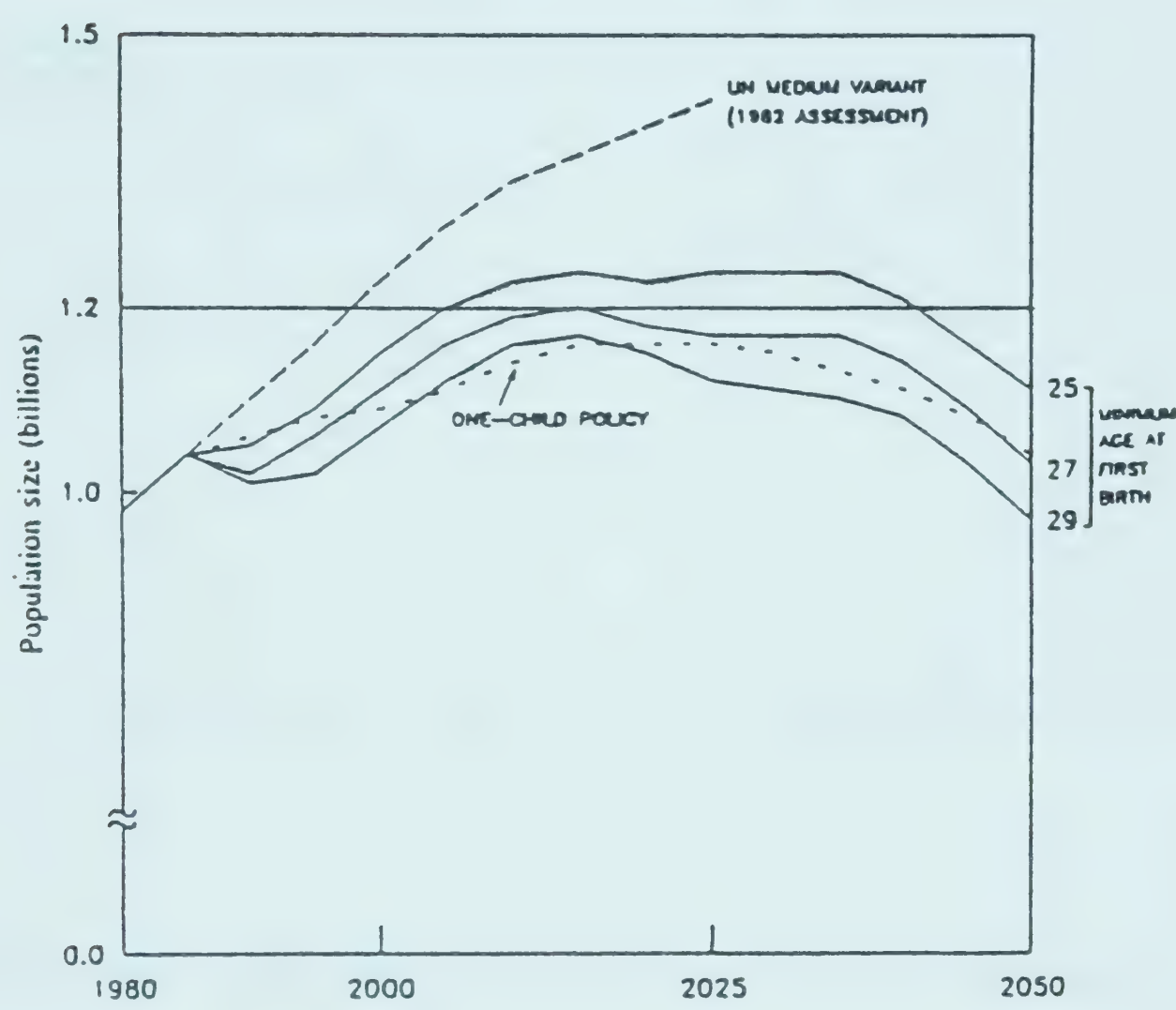
Source: *Almanac of China's Population, 1985*  
Population Research Center, CASS  
Chinese Social Sciences Publishing House

■ Male  
▤ Female

Source: Wu 1991, p. 31.

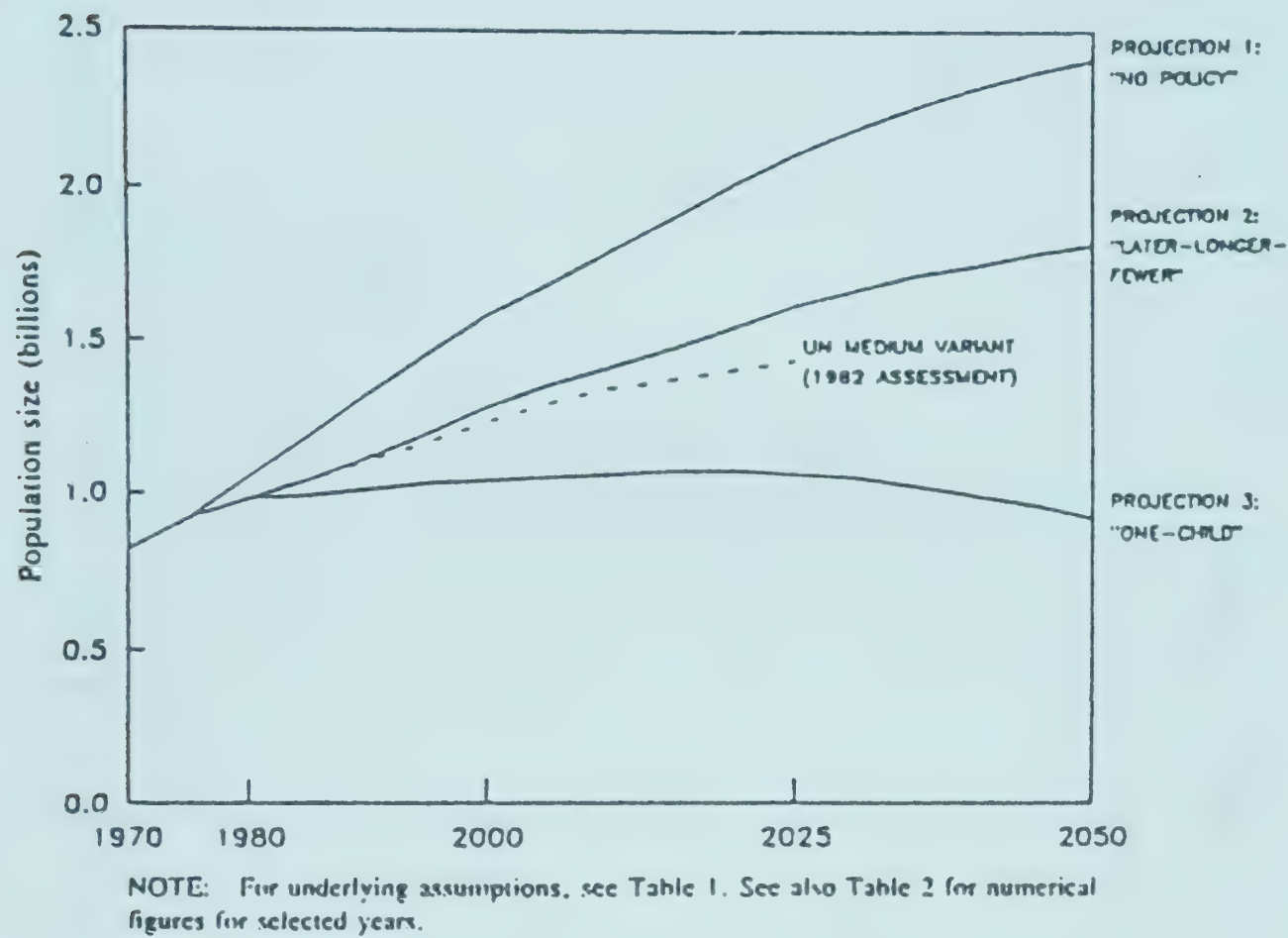
Figure 5.2

Projected population size of China, 1985-2050, according to the United Nations medium variant, the one-child policy, and variants of a hypothetical stop-at-two policy, assuming four years of spacing between children



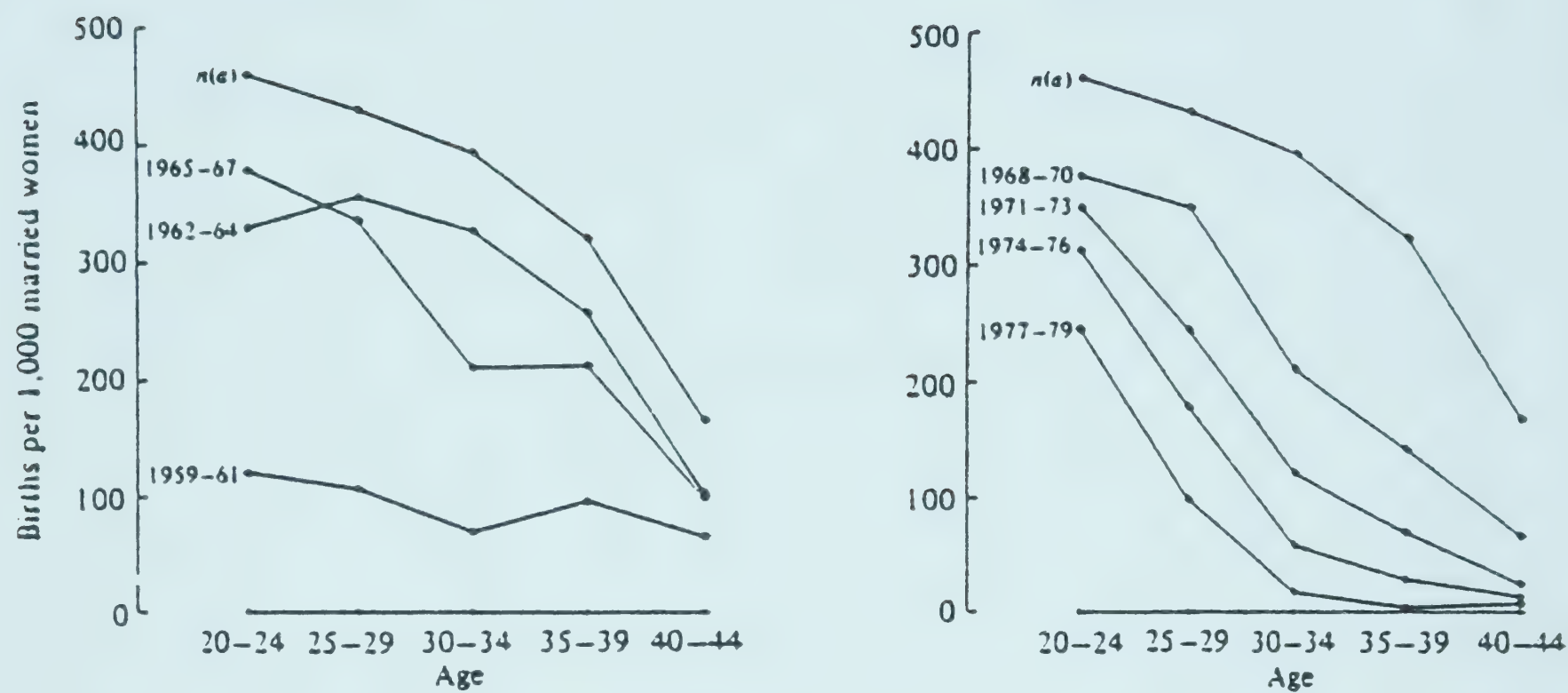
Source: Bongaarts and Greenhalgh 1985, p. 602, Figure 2.

Figure 5.1  
Population size of China, 1970-2050, according to projections  
incorporating alternative birth control policies and according  
to the United Nations medium variant projection



Source: Bongaarts and Greenhalgh 1985, p. 591, Figure 1.

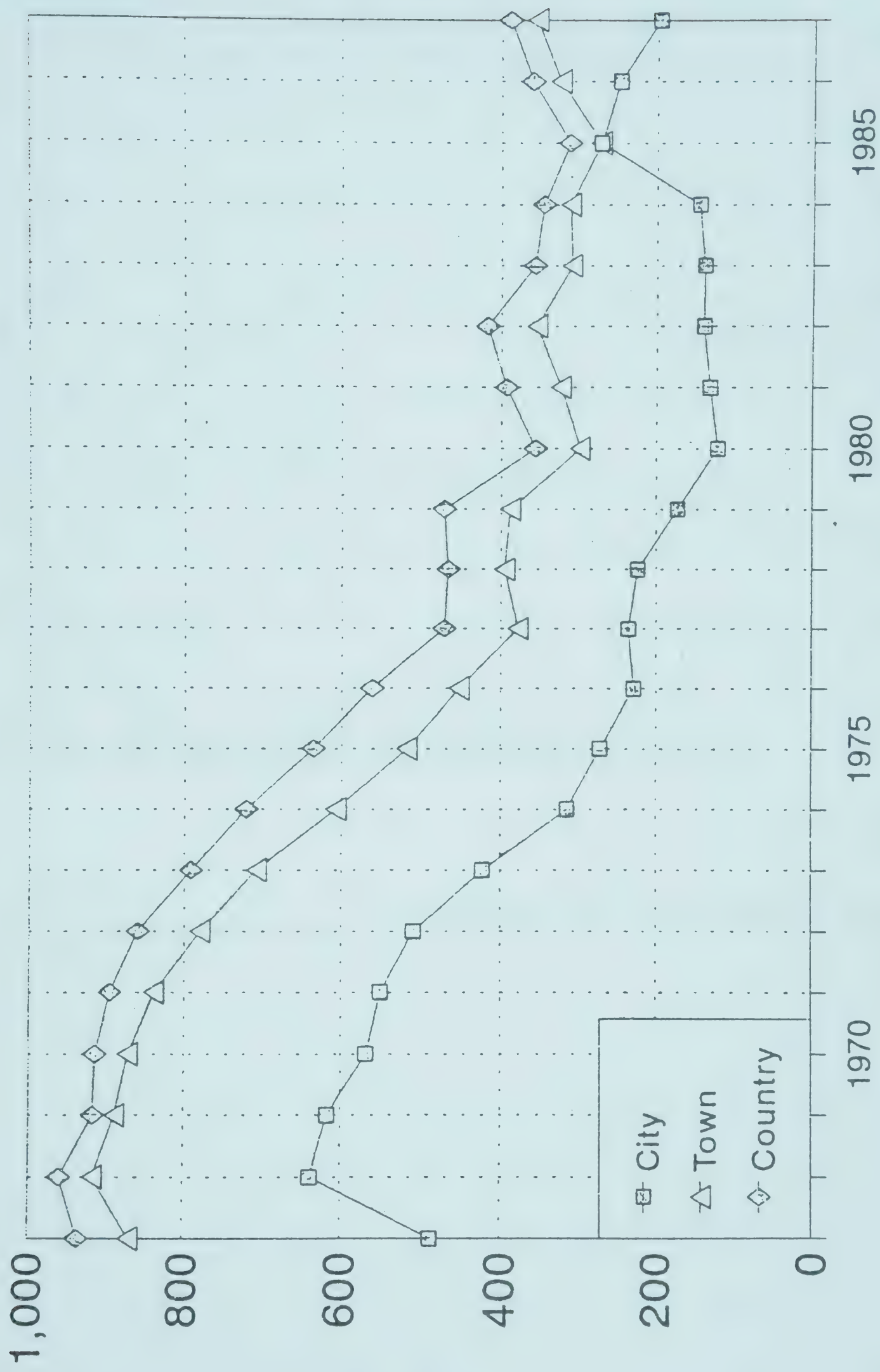
Figure 3.15



Age pattern of marital fertility, 1959-1967, and natural fertility schedule  $n(a)$ .  
Age pattern of marital fertility, 1968-1979, and natural fertility schedule  $n(a)$ .

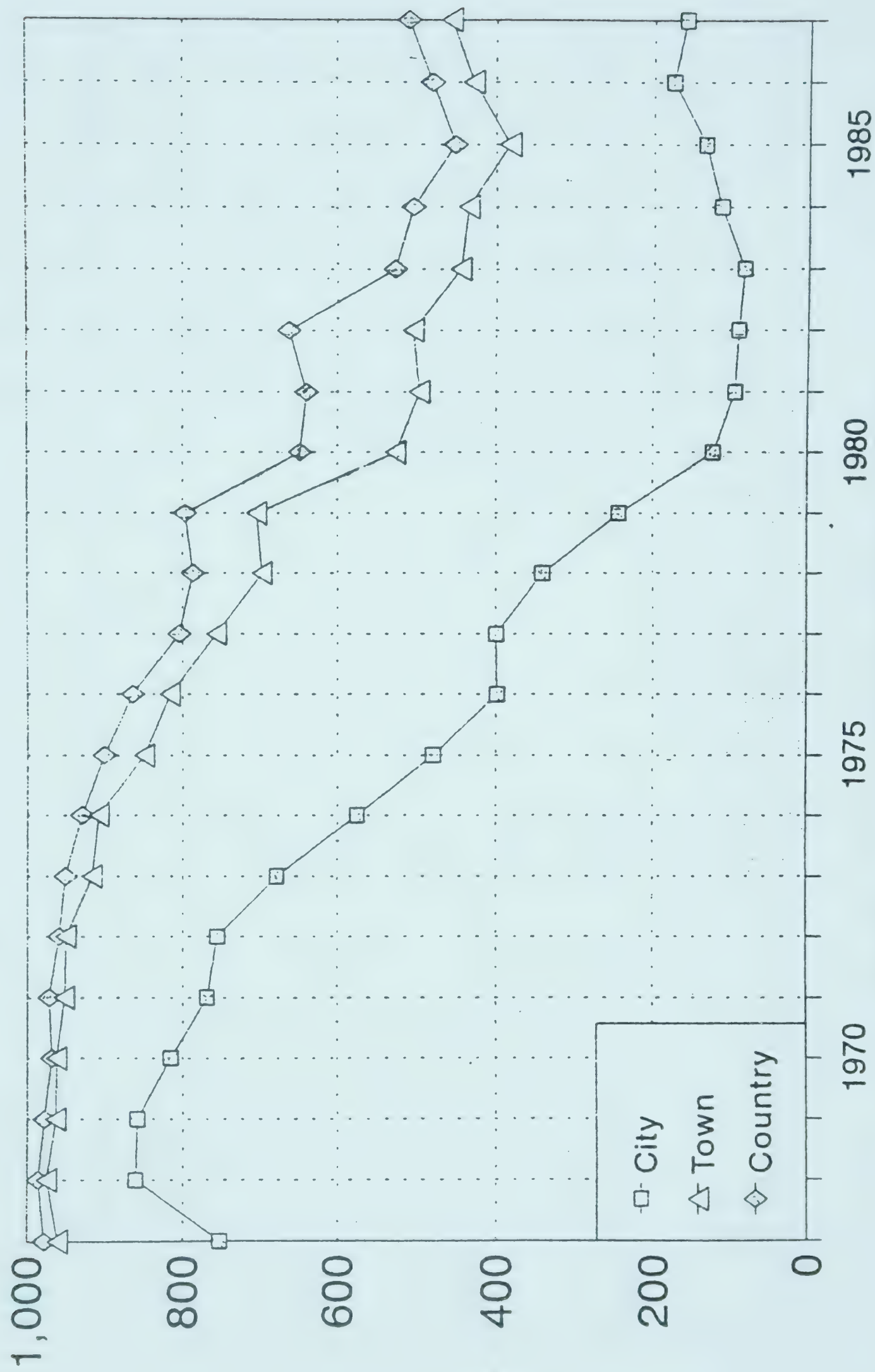
Source: Lavelly 1984, p. 382, Figures 8, 9.

Figure 3.14  
Period proportions per 1,000 women progressing from third and higher order  
to fourth and higher order births in China, by residence, 1967-87



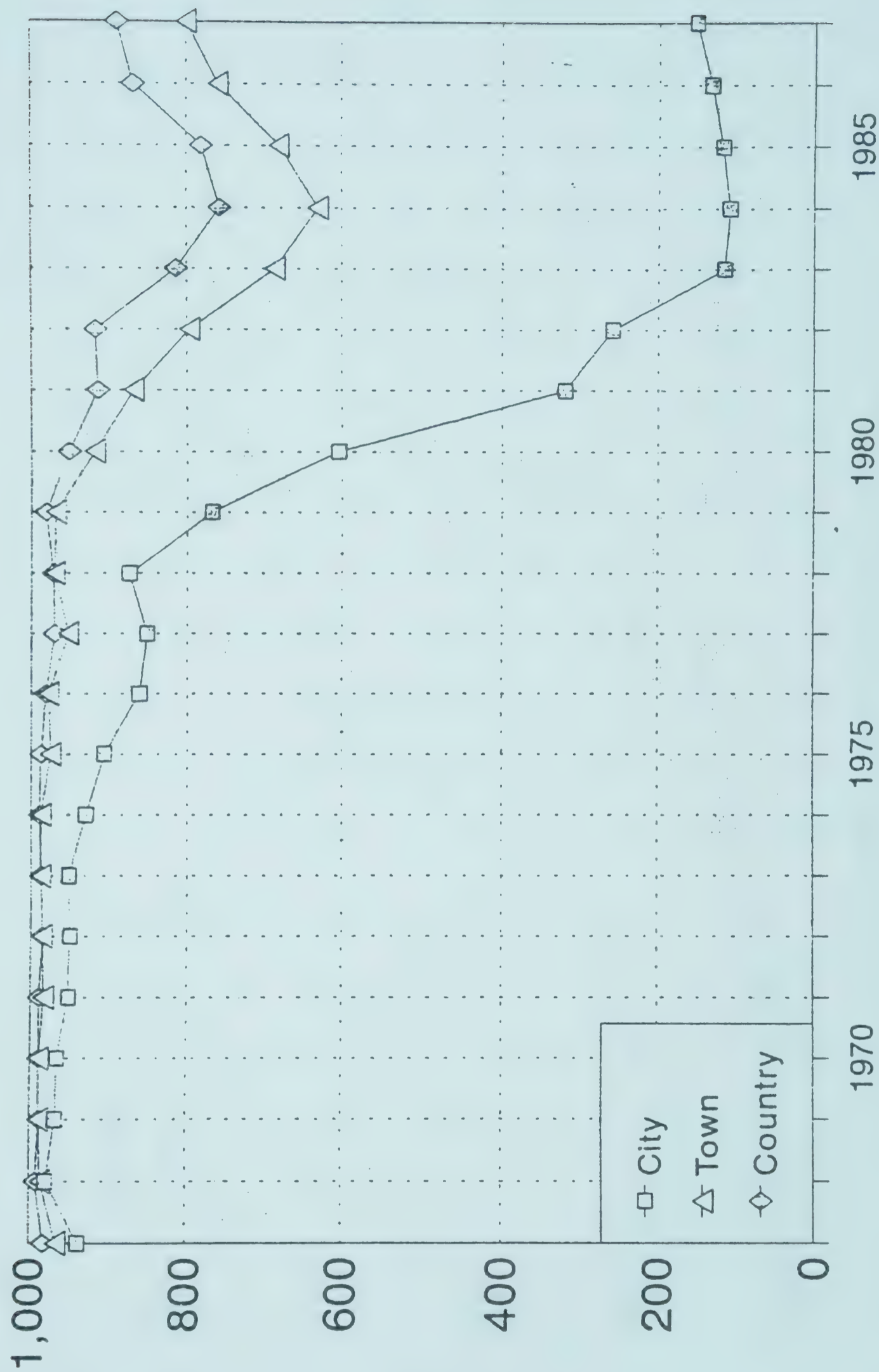
Source: Feeney and Wang, 1993, Table 9.

Figure 3.13  
Period proportions per 1,000 women progressing from second  
to third birth in China, by residence, 1967-87



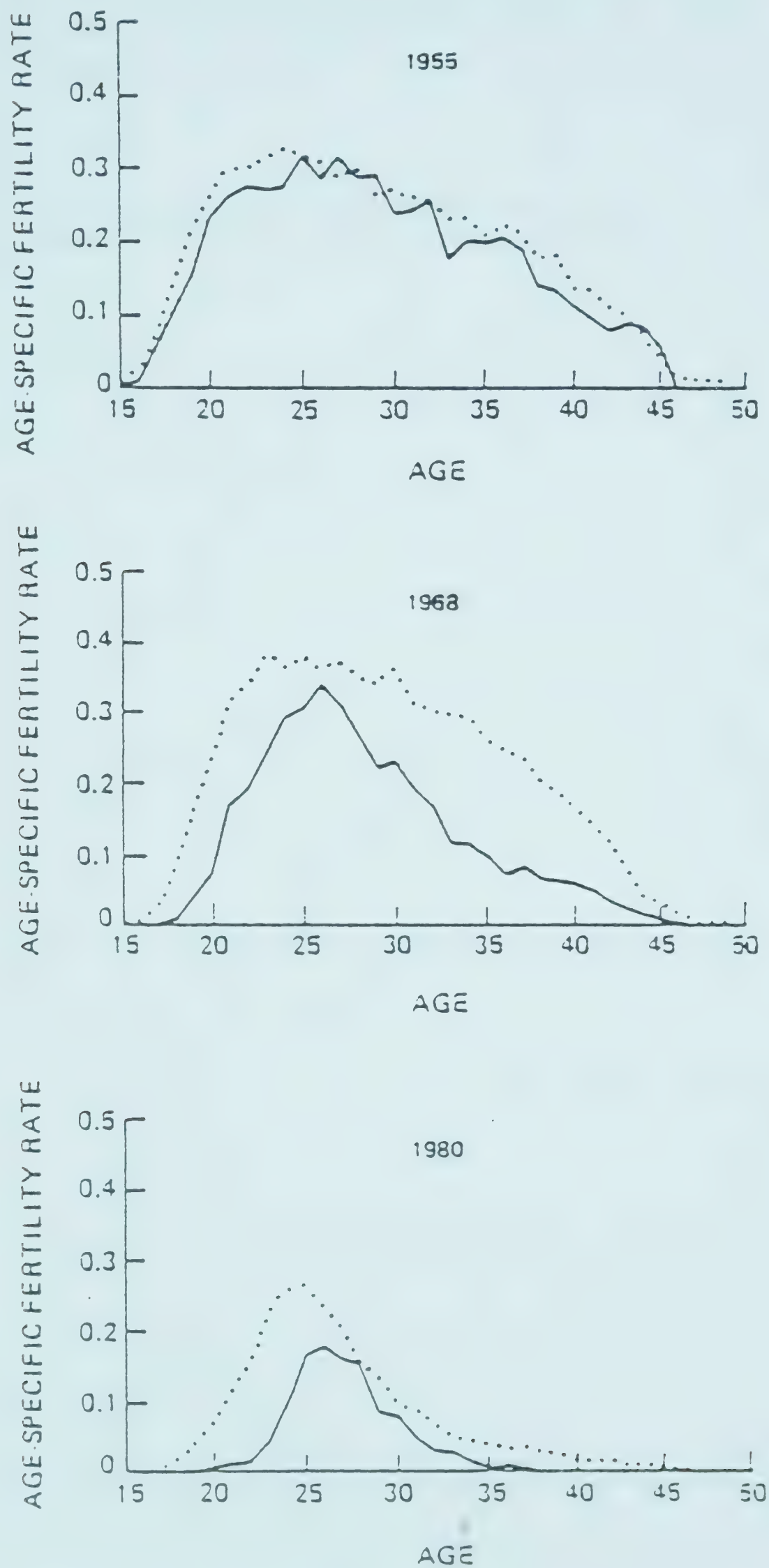
Source: Feeney and Wang, 1993, Table 7.

Figure 3.12  
Period proportions per 1,000 women progressing from first  
to second birth in China, by residence, 1967-87



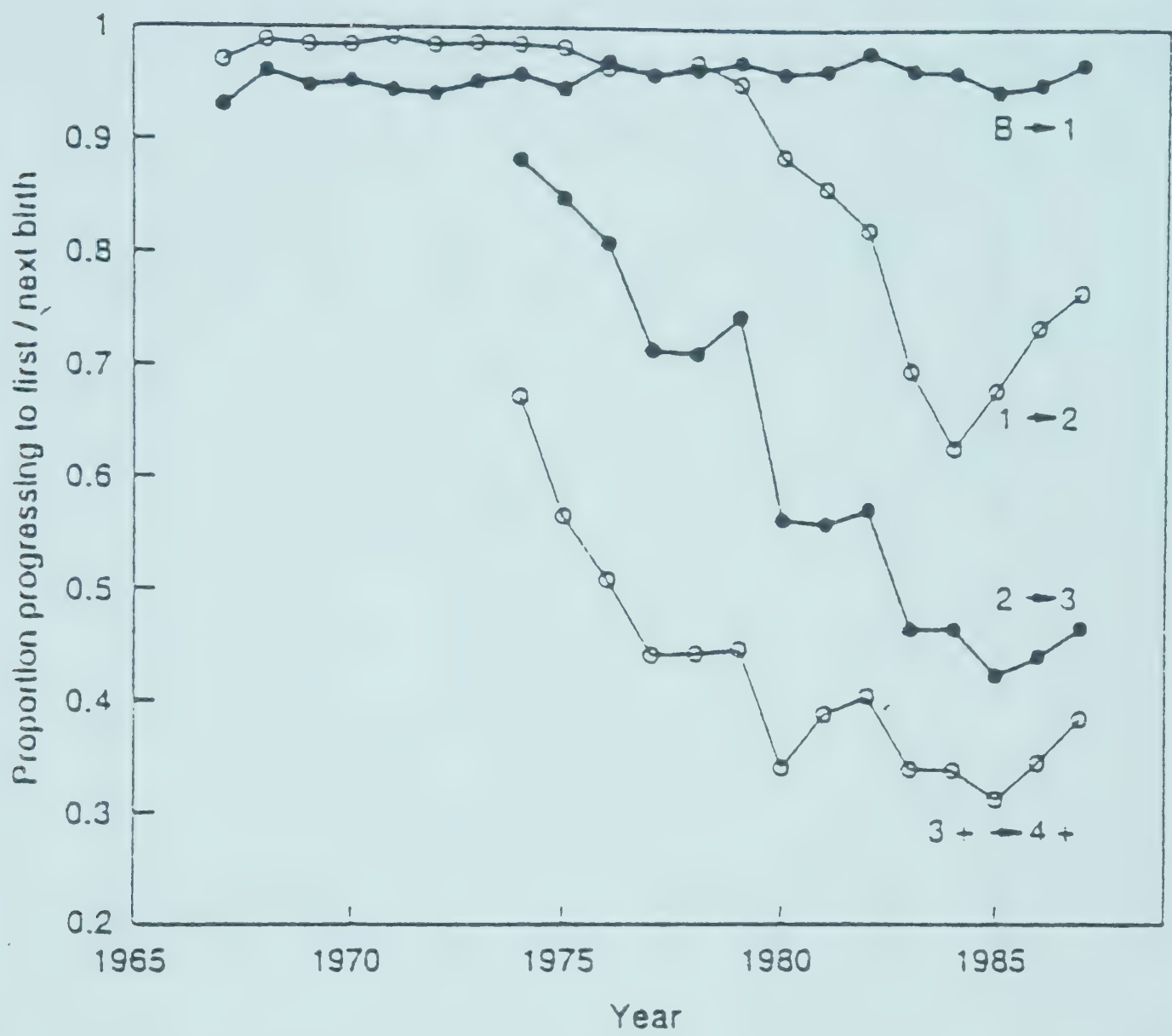
Source: Feeney and Wang, 1993, Table 5.

Figure 3.11  
Age-Specific Fertility Rates, Rural (dotted line) and  
Urban (solid line), Populations, 1955, 1968, and 1980: China



Source: Coale 1984, p. 61, Figure 15.

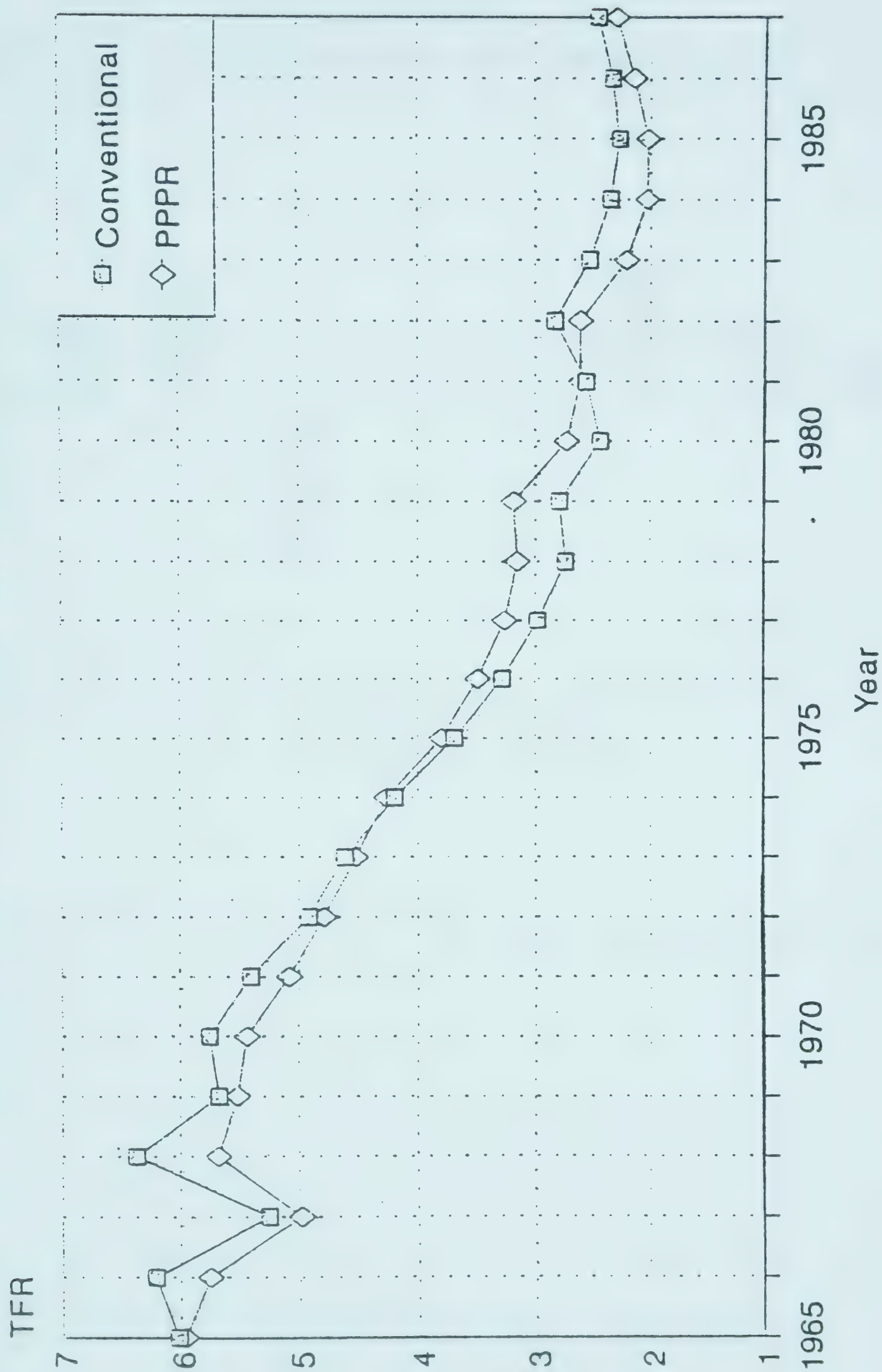
Figure 3.10  
Period parity progression ratios for China: 1967-1987



Source: Table 6.5.

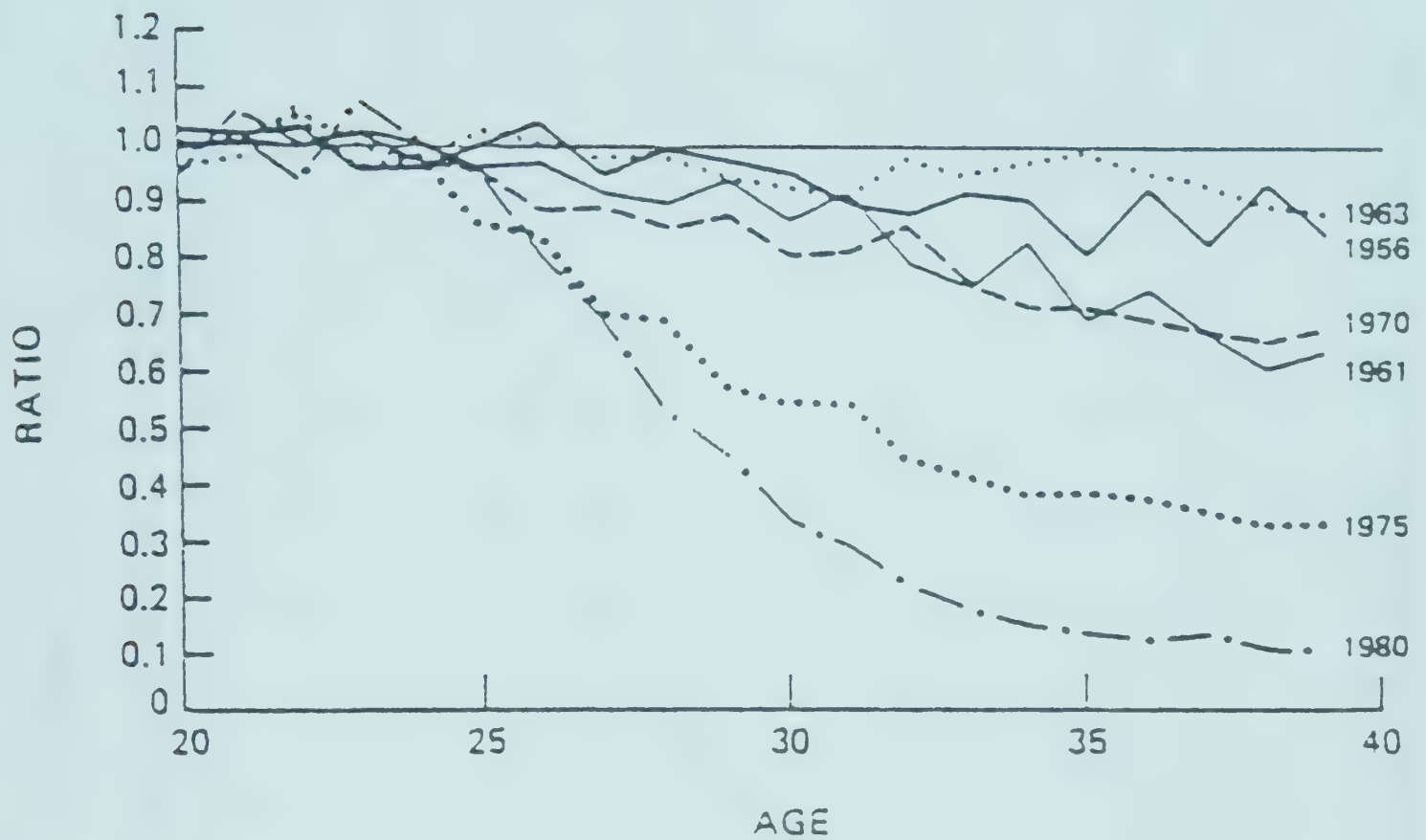
Source: Feeney 1994, p. 132, Figure 6.7.

Figure 3.9  
Conventional and PPPR Total Fertility Rates for China, 1965-1987



Source: Feeney 1994, Table 6.3.

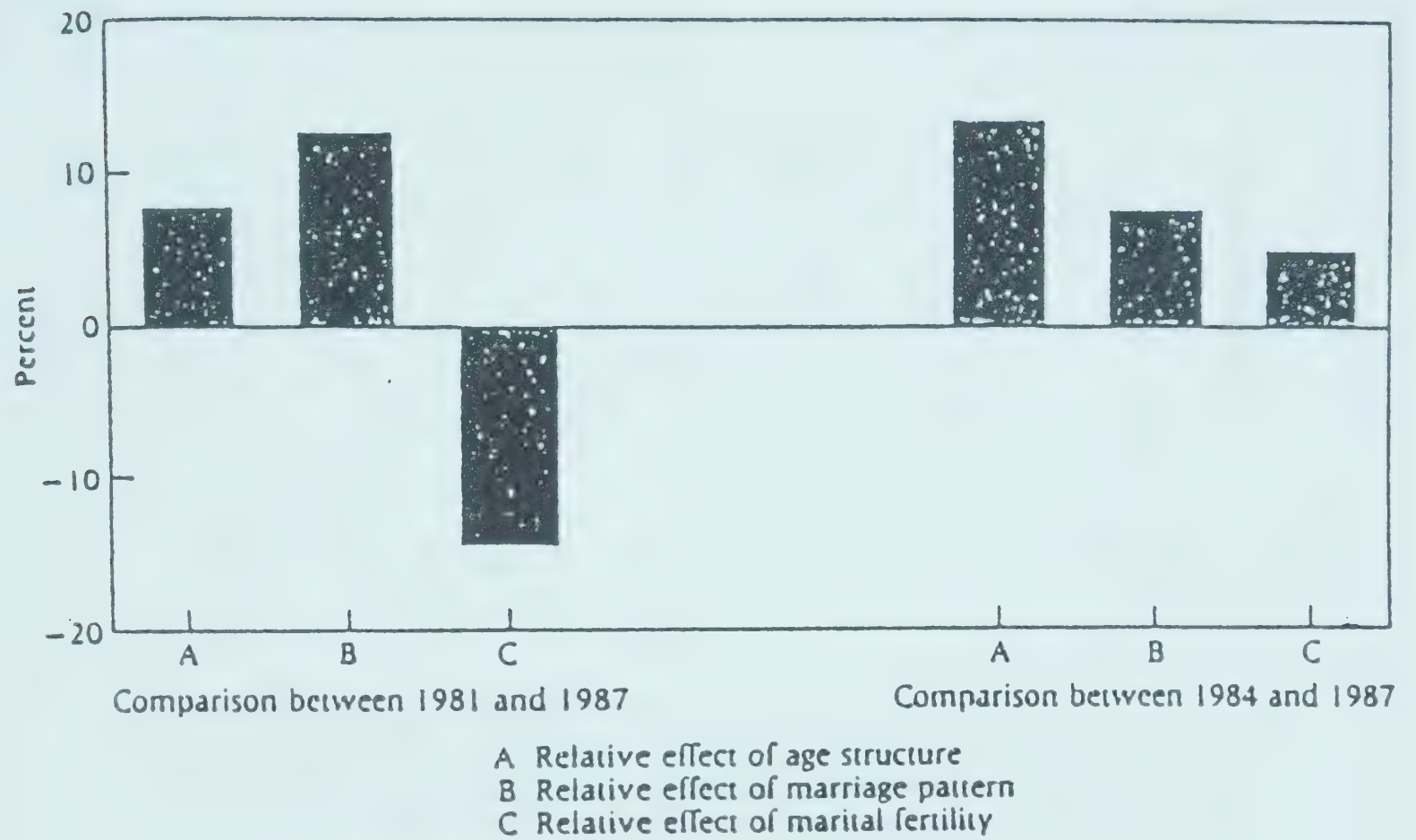
Figure 3.8  
 Ratio of age-specific marital fertility to natural fertility  
 (with ratio at 20-24 set at 1.00),  
 1956, 1961, 1970, 1975, and 1980: China



Source : Coale 1984, p. 56, Figure 13.

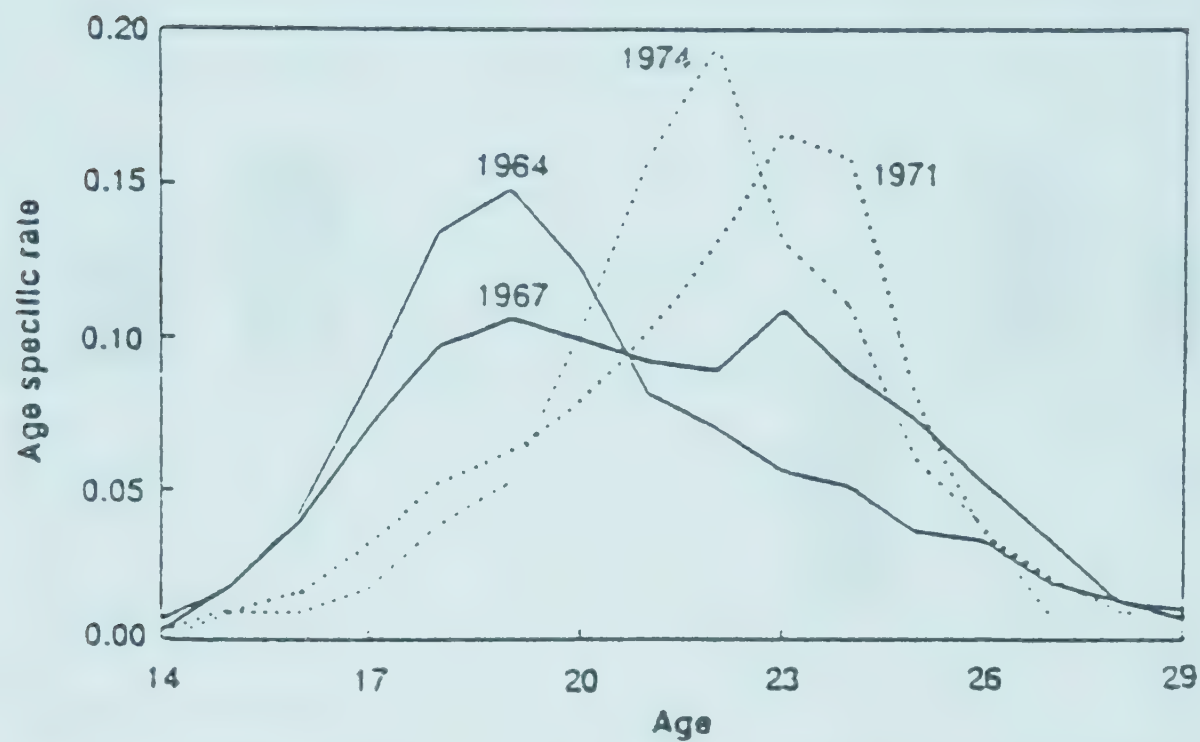
Figure 3.7

Relative effect of three factors affecting the increase in the crude birth rate between 1981 and 1987 and between 1984 and 1987 for China as a whole



Source: Zeng et al. 1991, p. 443, Figure 2.

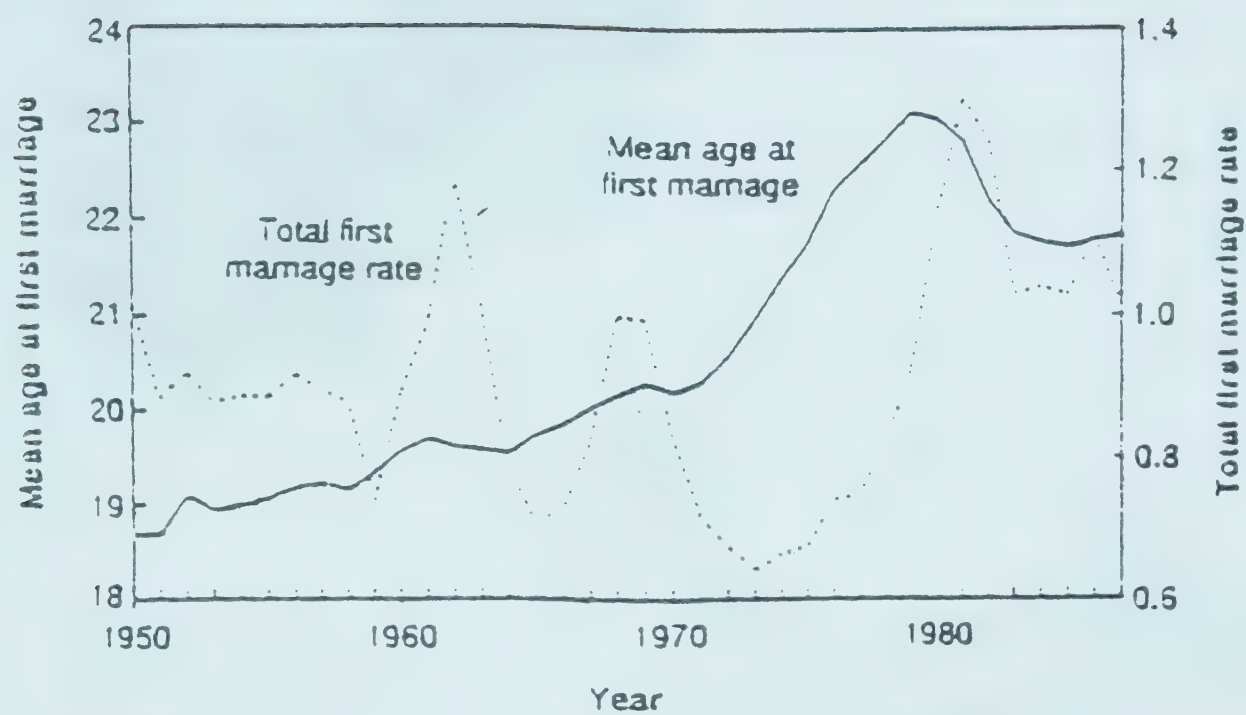
Figure 3.6



First marriage rates by age, cohorts reaching age 14 in different specified years, 1964 to 1974. These irregular curves show how the age pattern of entry into marriage was affected in different degrees and different ways by government intervention in the choice of age at marriage.

Source: Coale et al. 1991, p. 391, Figure 4.

Figure 3.5

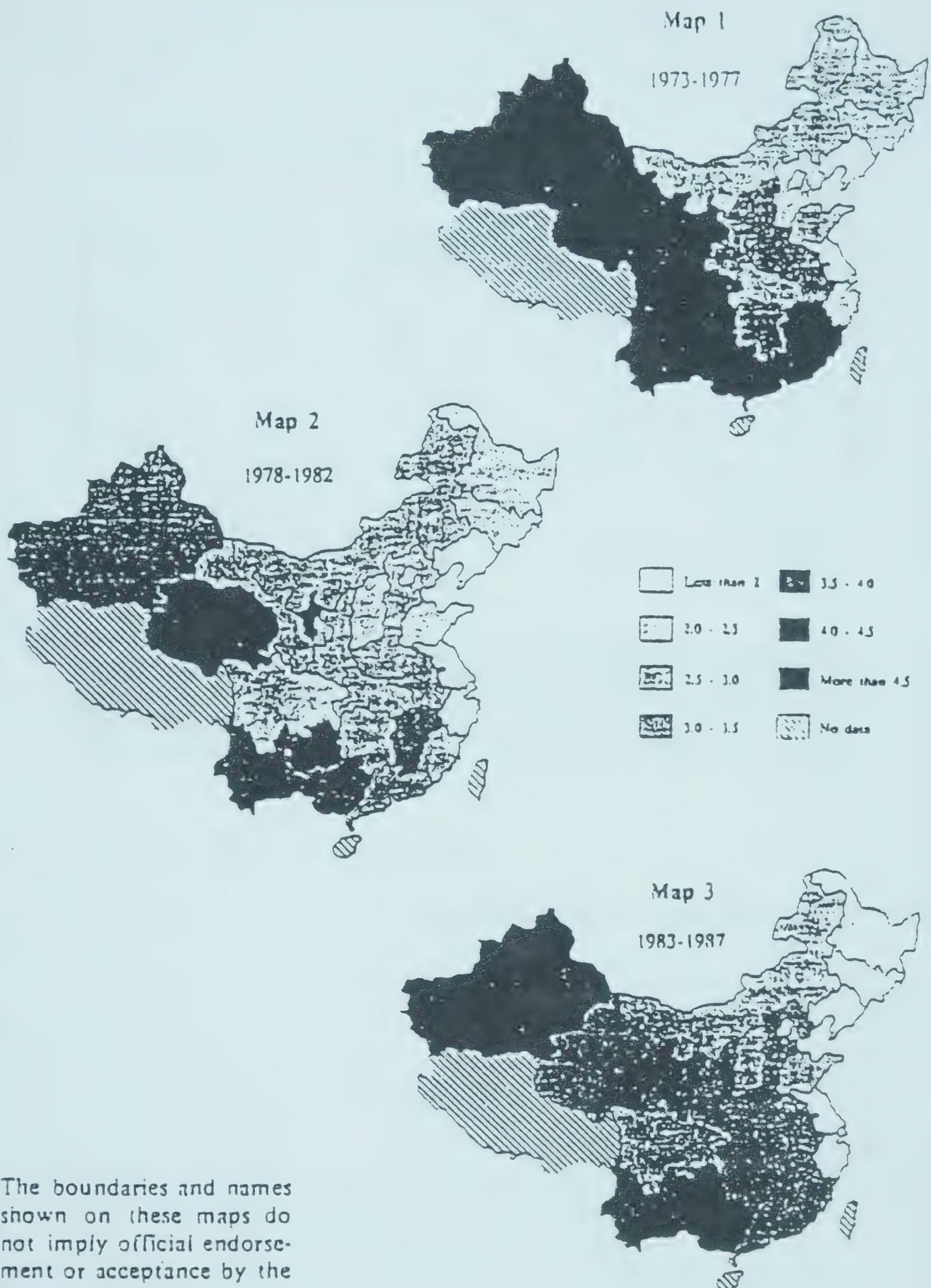


Mean age at first marriage and total first marriage, China, 1950–1987. The total first marriage rate is the sum of the first marriage rates at each age in the given period. Because almost all women have married no later than age 35, if age of entry were stable from year to year, TMR in China would be about 1.0. It differs by more than a small margin because age at marriage has varied.

Source: Coale et al. 1991, p. 390, Figure 2.

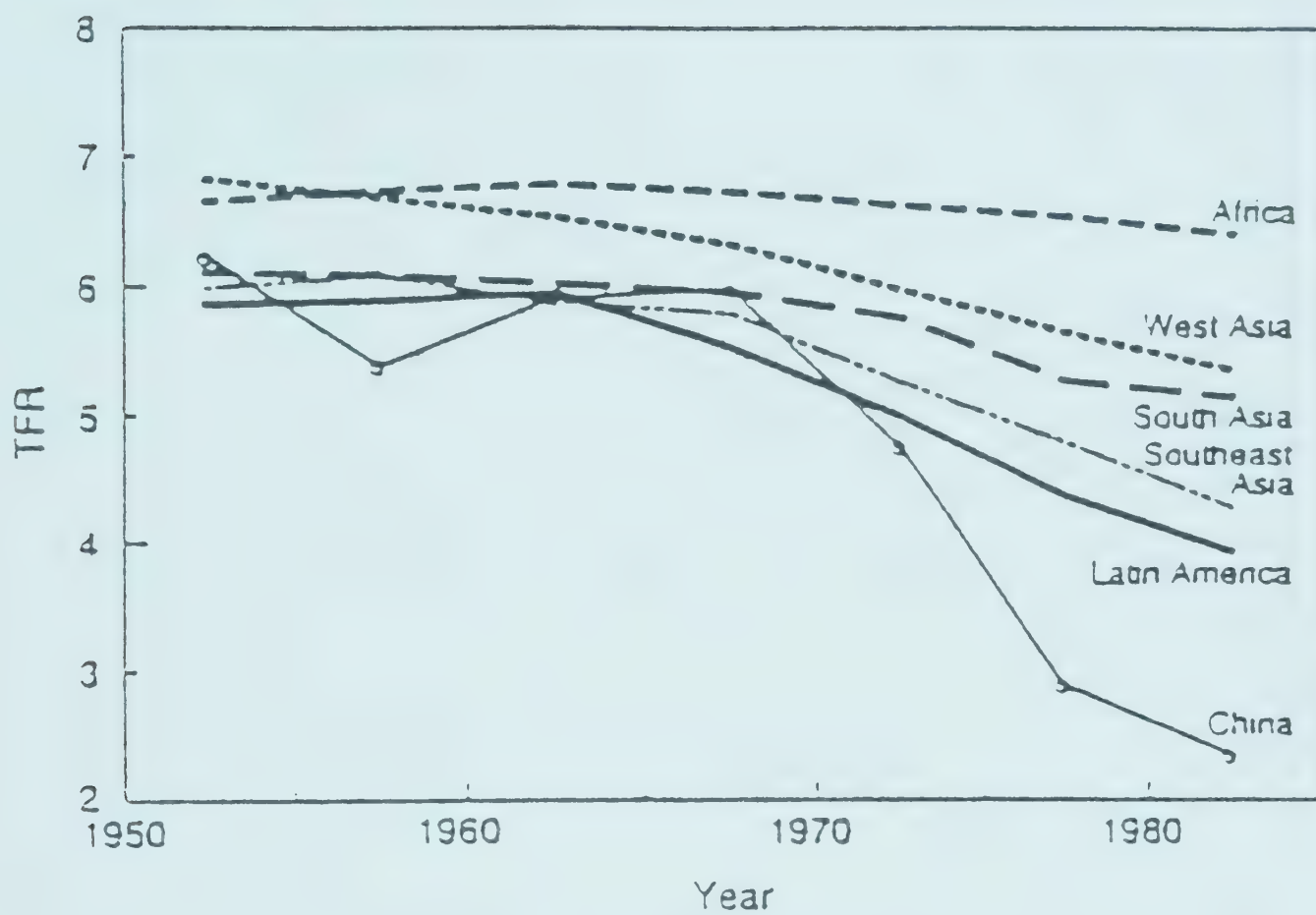
Figure 3.4

Total fertility rates of China, by province: 1973-1977,  
1978-1982 and 1983-1987



Source: Li 1990, p. 8.

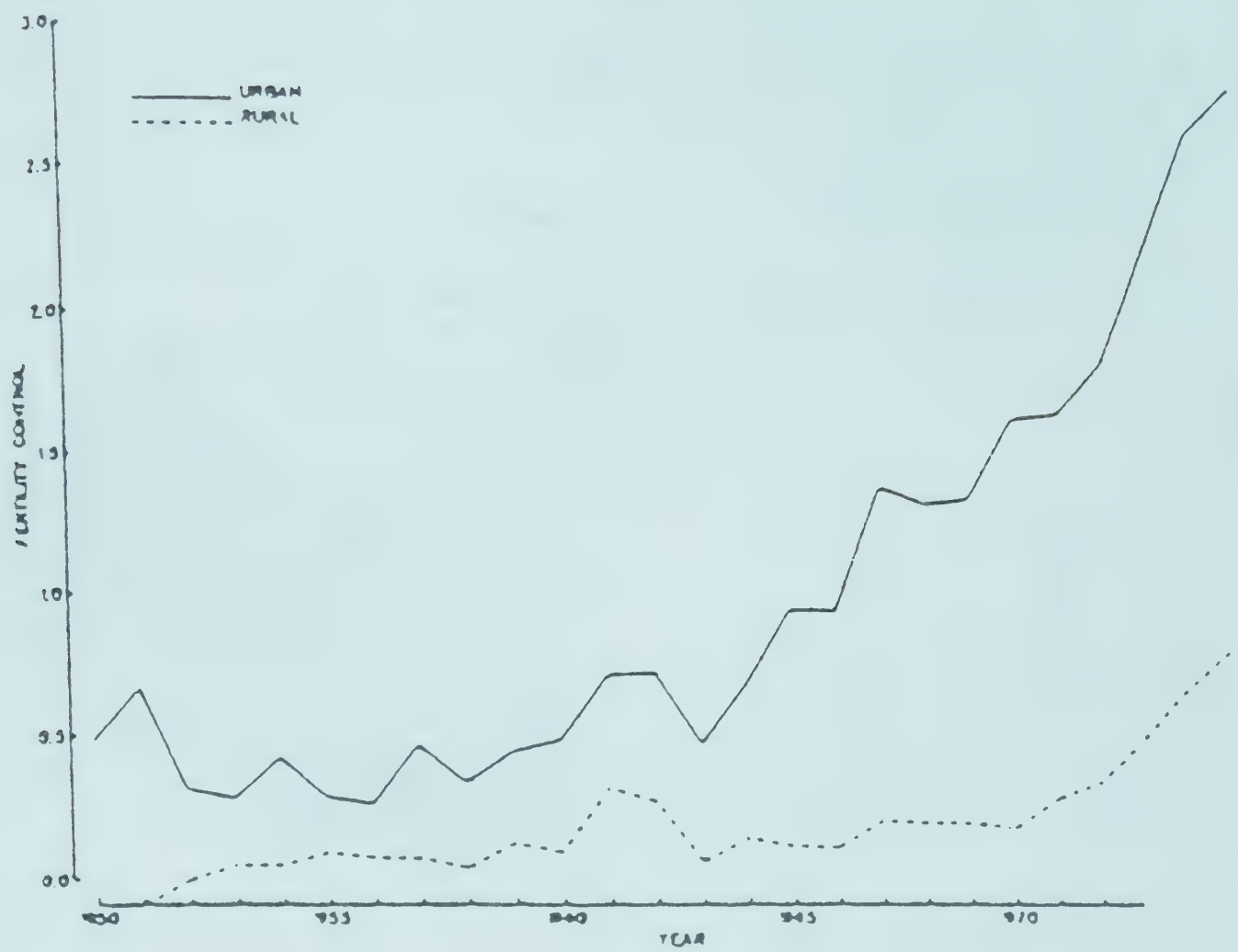
Figure 3.3  
Fertility decline in China compared with fertility decline  
in other areas in the developing world.



Source: *Table 6.1.*

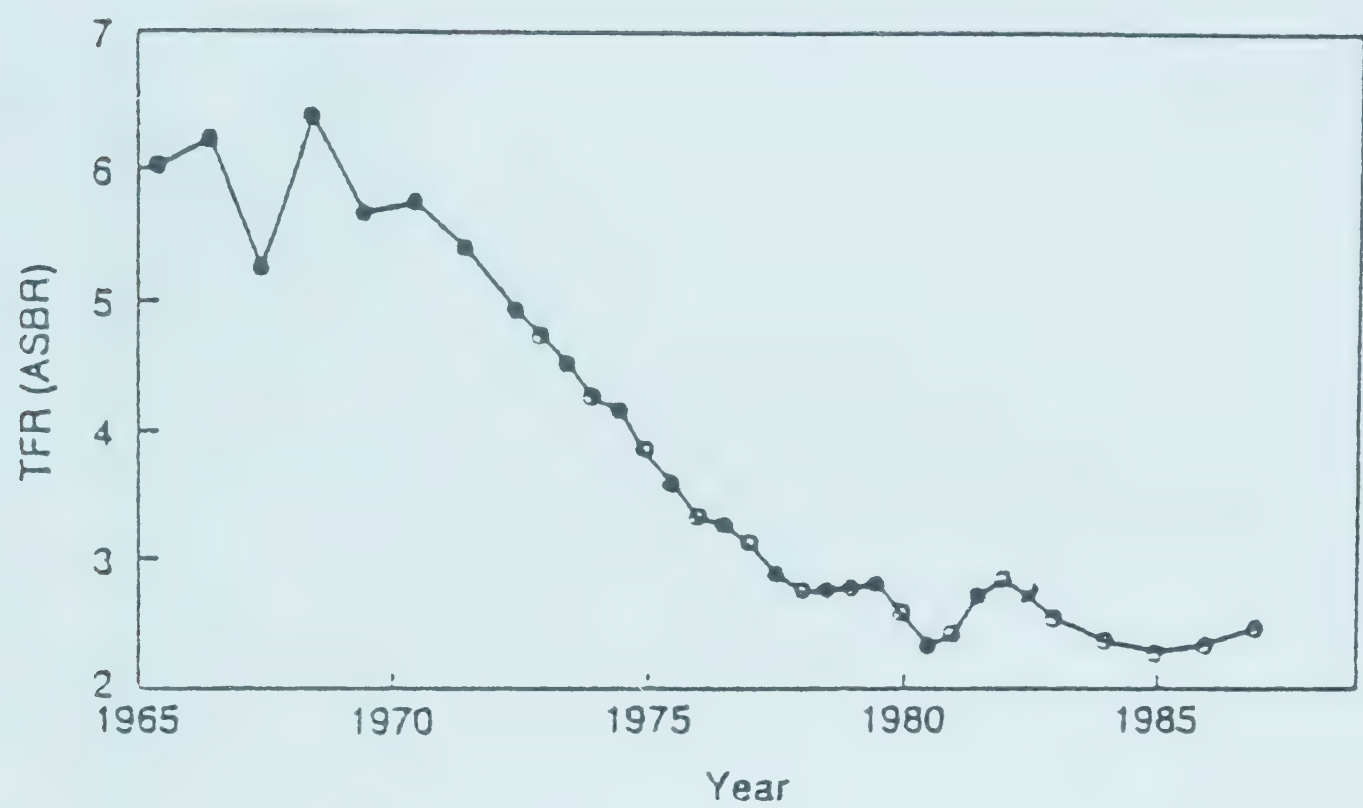
Source: Feeney 1994, p. 117, Figure 6.1.

Figure 3.2  
Index of marital fertility control (m), 1950-1975: China



Source: Lavelly 1986, p. 423, Figure 3.

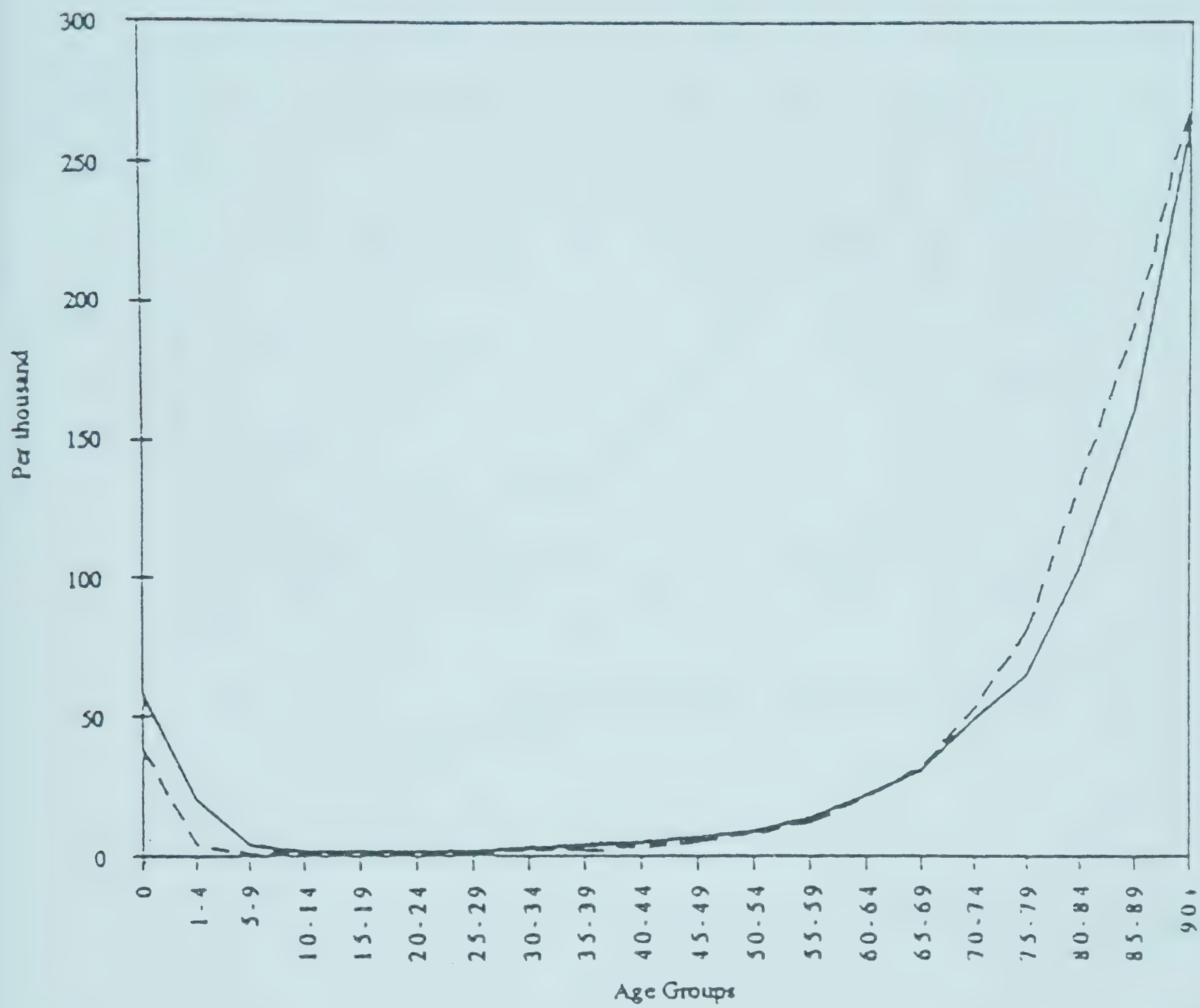
Figure 3.1  
Conventional total fertility rates for China: 1965-1987.



Source: *Table 6.3*, columns 1 and 2.

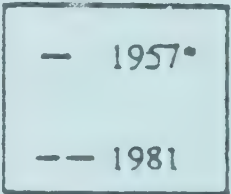
Source: Feeney 1994, p. 124, Figure 6.3.

Figure 2.1  
Age-Specific Mortality Rate, China, 1957 and 1981



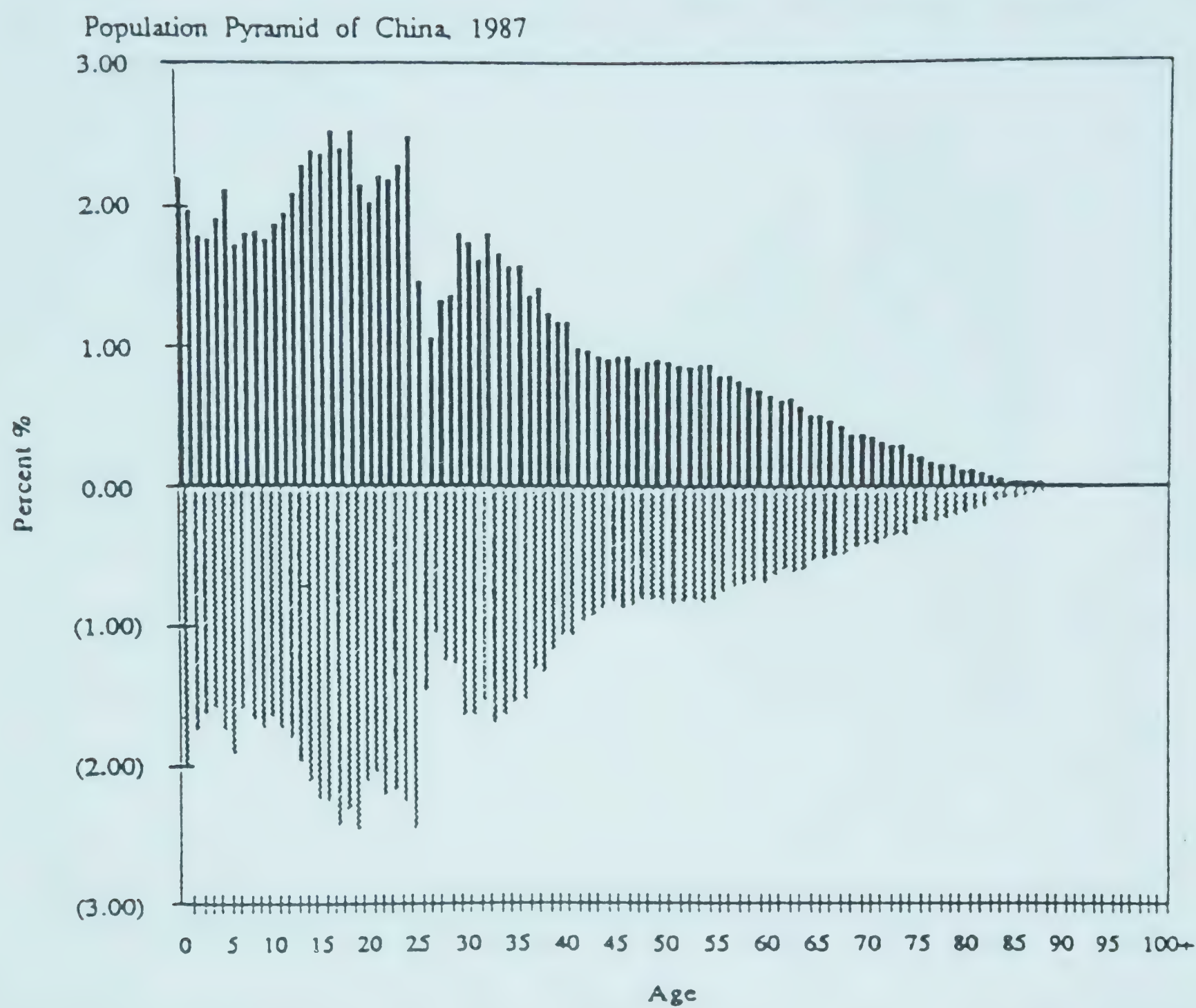
\* Survey data in some regions

Source: *Population Handbook, 1986*  
Population Information and Research Center of China



Source: Wu 1991, p. 41, Figure 3.3.

Figure 1.6



Source: *Tabulations of China 1% Population Sample Survey (National Volume)*  
Department of Population Statistics  
State Statistical Bureau

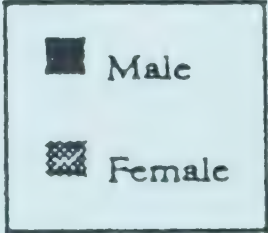
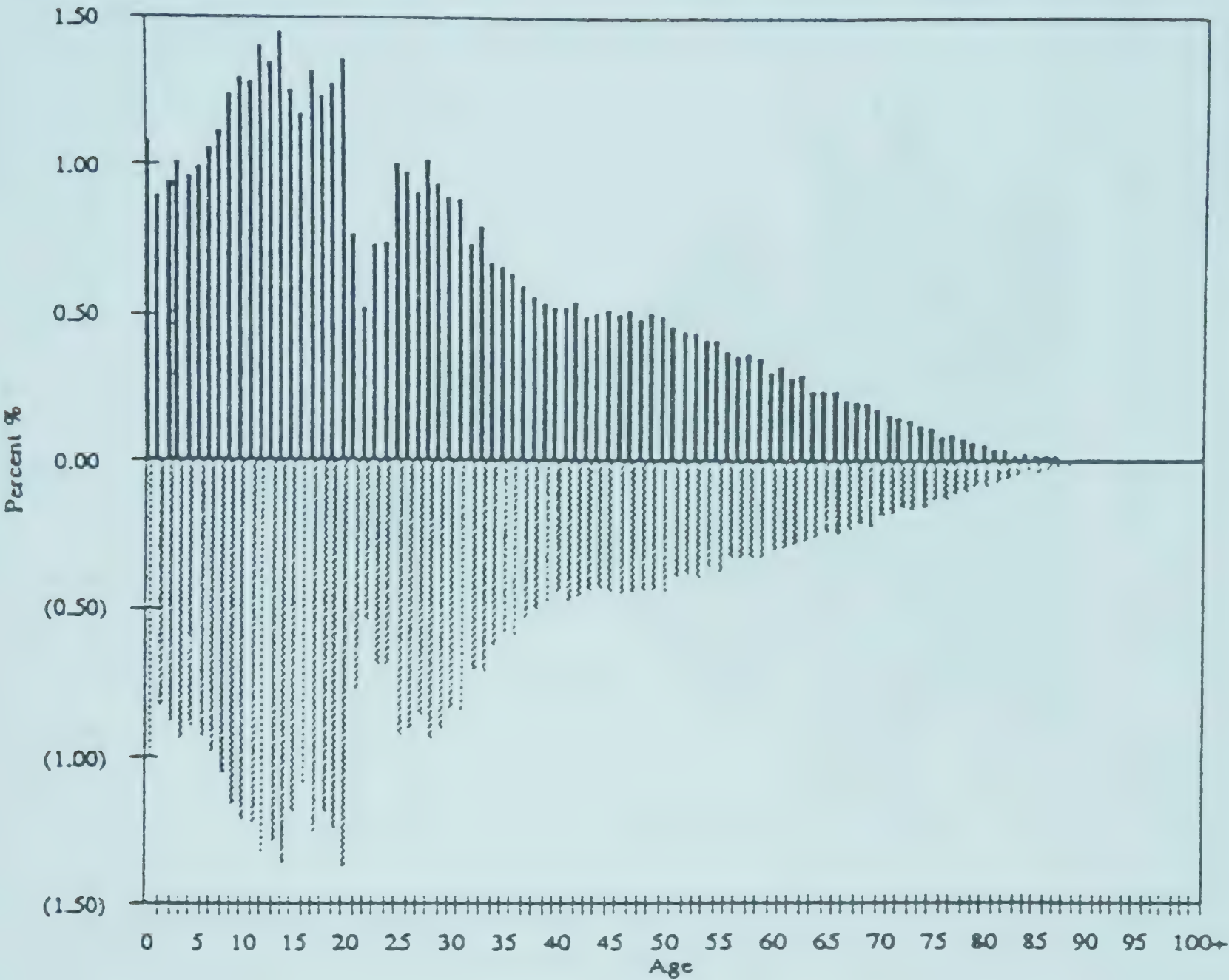


Figure 1.5

Population Pyramid of China, 1982



Source: *Almanac of China's Population, 1985*  
Population Research Center, CASS  
Chinese Social Sciences Publishing House

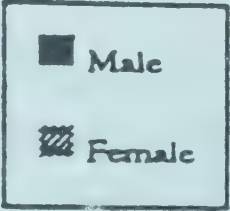
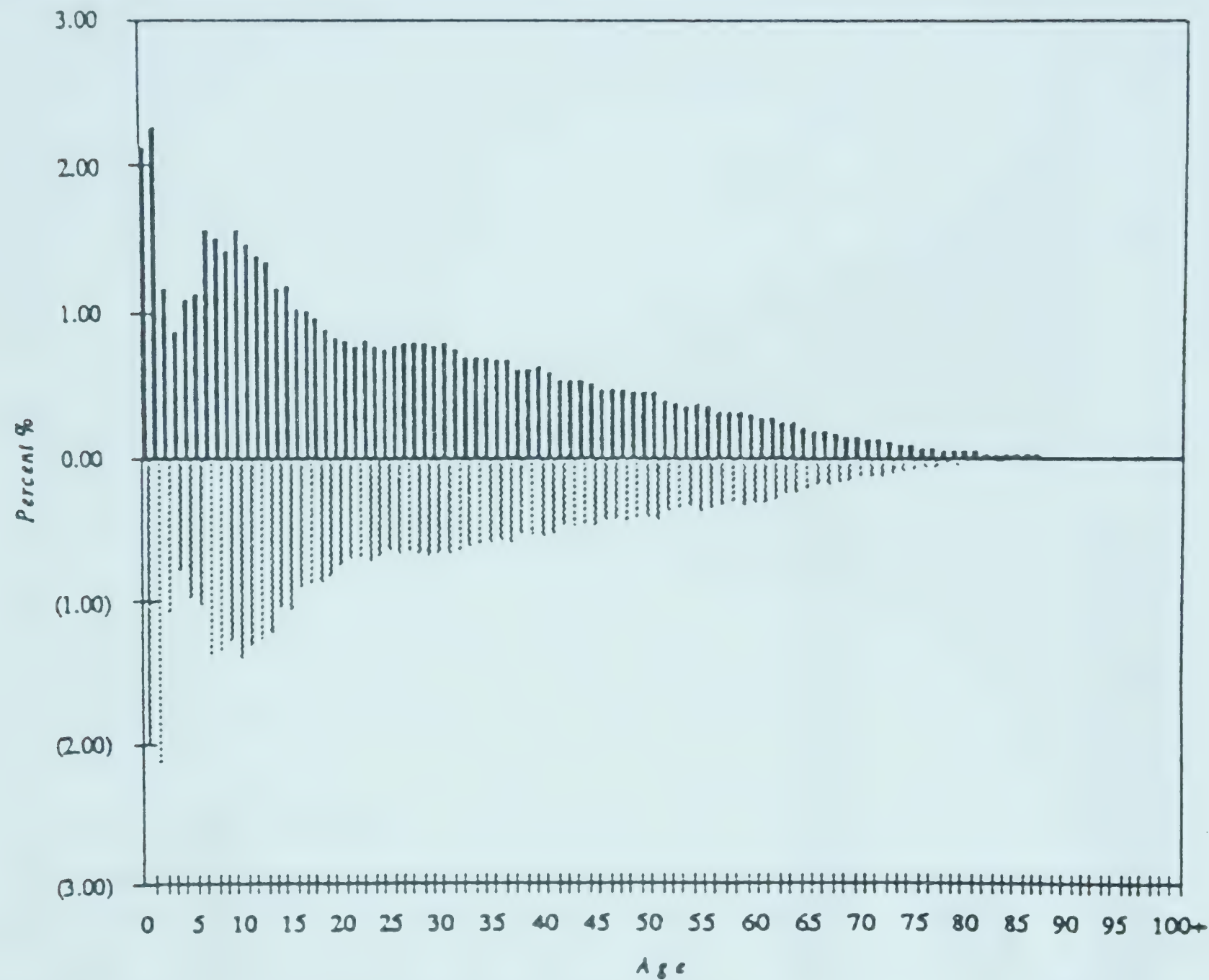


Figure 1.4

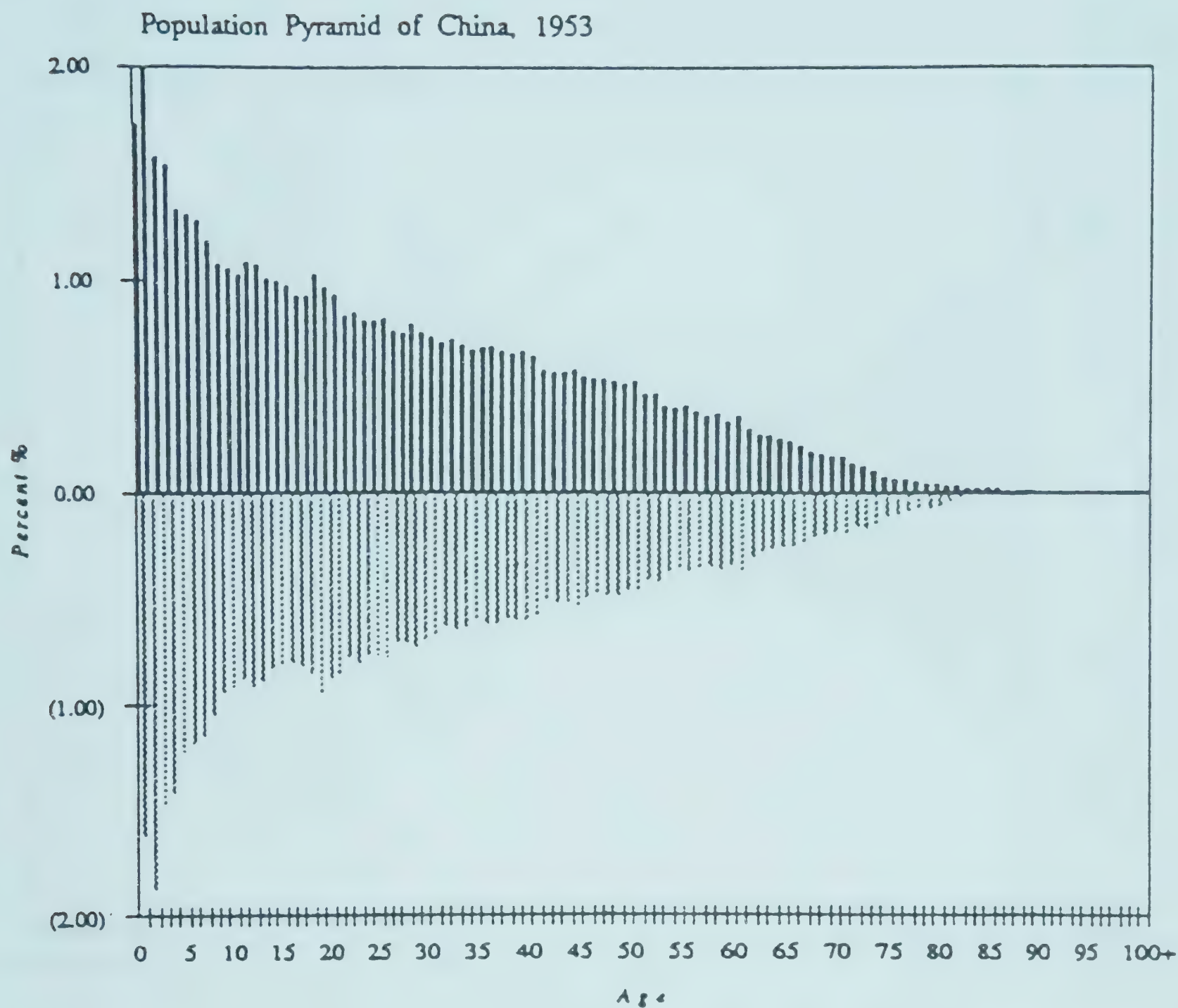
Figure 2.4 Population Pyramid of China, 1964



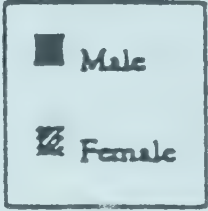
Source: *Almanac of China's Population, 1985*  
Population Research Center, CASS  
Chinese Social Sciences Publishing House



Figure 1.3

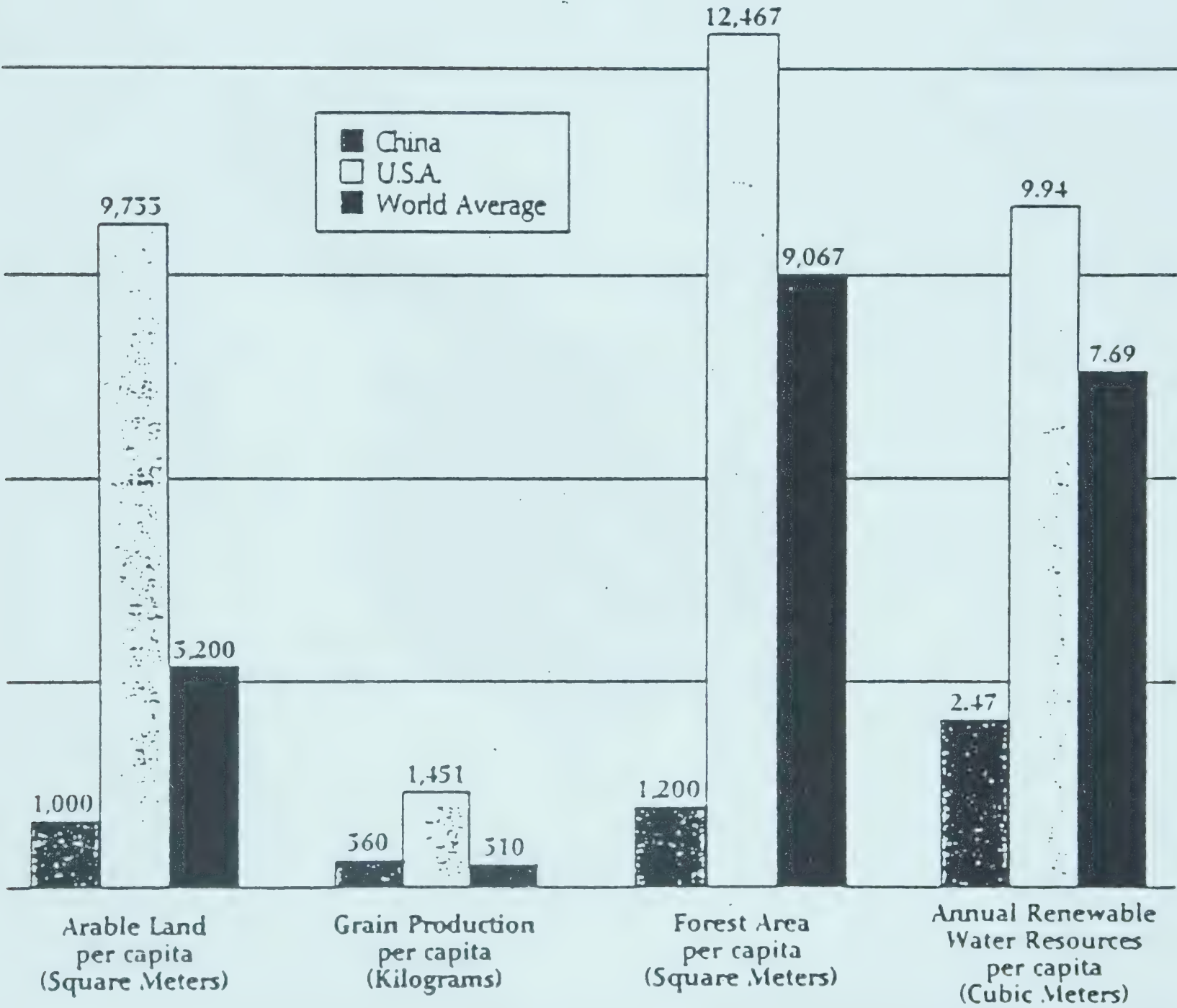


Source: *Almanac of China's Population, 1985*  
Population Research Center, CASS  
Chinese Social Sciences Publishing House



Source: Wu 1991, p. 31-2

Figure 1.2  
Natural resource availability in China compared  
to the United States and the world average



Source: Data for water statistics from World Resources Institute, *World Resources 1990-91*, New York: Oxford University Press, p. 268, 269. Other data from the State Family Planning Commission of China.

Source: Conly and Camp. 1992, p. 5, Figure 2.

Figure 1.1  
Population density (persons / km<sup>2</sup> China 1990)



Source: China Population Today V. 11 no. 2 July 1994, p. 11.



Table 6.1  
Age Distribution for China, 1953-2050

Year	0-14				15-59				60+	
	No.		%		No.		%		No.	%
1953	205840.9	36.28	320067.5	56.40	41538.4	7.32				
1964	220671	40.41	371656	53.51	42254.8	6.08				
1982	337251.2	33.59	590024.9	58.57	76637.8	7.64				
1987	307164.5	28.76	670267.7	62.77	90495.6	8.47				
2000	330835	26.05	809929	63.77	129337	10.18				
2010	311593	22.69	899332	65.48	162575	11.84				
2020	300975	20.58	937442	64.21	222033	15.21				
2030	318230	20.87	895363	58.71	311493	20.42				
2040	303274	19.64	899712	58.27	341015	22.09				
2050	306178	19.79	910204	58.83	330795	21.38				

Source: (1953-1982) *Almanac of China's Population, 1985*  
Population Research Center, CASS  
(1987) *Tabulations of China 1% Population Sample Survey* (National Volume)  
Department of Population Statistics, State Statistical Bureau  
(2000-2050) *Population Projection for China*, Naohiro Ogawa et al.,  
UNFPA Assisted Project: CPR/85/P54  
"Development of Research on the Aged for Policy Making Purposes", Research Report No. 1, JOICFP

Source: Wu 1991, p. 27, Table 2.2.

Table 5.5  
Sex ratio of aborted fetuses by number and sex of  
surviving children: southern Zhejiang Province, 1993

Surviving children		Total aborted	Male fetuses aborted	Female fetuses aborted	Sex ratio of aborted fetuses
Male	Female				
0	0	4,518	2,345	2,173	107.9
1	0	2,559	1,329	1,230	108.0
0	1	3,124	1,055	2,069	51.0
2 +	0	81	40	41	97.6
0	2	105	38	67	56.7
0	3 +	15	4	11	36.4
1 +	1 +	380	196	184	106.5
Total		10,782	5,007	5,775	86.7

Source: Gu and Li (1994: table 7).

Source: Gu and Roy 1995, p. 29, Table 5.

Table 5.6  
Sex ratio at birth and total fertility rate in the 1980s:  
China, Taiwan Province of China and the Republic of Korea

Year	China		Taiwan Province of China		Republic of Korea	
	SRB	TFR	SRB	TFR	SRB	TFR
1980	107.4	2.24	106.4		103.9	
1981	107.1	2.63	107.0		107	
1982	107.2	2.86	106.9		106.9	2.7
1983	107.9	2.42	106.7	2.16	107.7	
1984	108.5	2.35	107.3		108.7	2.1
1985	111.4	2.20	106.6		110.0	
1986	112.3	2.42	107.2	1.68	111.9	
1987	111.0	2.59	108.3	1.70	109.0	1.6
1988	108.1	2.52	108.2	1.85	113.5	1.6
1989	113.9	2.35	108.6	1.68	112.1	
1990	114.7	2.31	110.2	1.81	116.9	1.6
1991	116.1	2.20	110	1.72	112.9	
1992	114.2	2.00			114.0	
1993	114.1					

Sources: Sex ratio at birth (SRB): China: (1980-1989) Gu and Li, 1994: table 1; (1990) SSB, 1991b; (1991) SSB, 1992; (1992) SSB, 1993b; (1993) SSB, 1994. Taiwan Province of China: Chang, 1994: table 4; (1991) Freedman, Chang and Sun, 1994: table 14. Republic of Korea: Park and Cho, 1995: table 6; (1981) Cho and Kim, 1994.

Total fertility rate (TFR): China: SFPC, 1994:68. Taiwan Province of China: Freedman, Chang and Sun, 1994: table 2. Republic of Korea: (1982, 1984, 1987) KIHASA, 1991:18; (1988, 1991) Hong, 1994.

Source: Gu and Roy 1995, p. 20, Table 1.

Table 5.4

China – 1990 Census missing girls ages 0-14

	(1) China males	(2) Expected normal sex ratio by age	(3) Expected females (1)/(2)/100	(4) China females	(5) Missing girls (3) (4)	(6) Proportion of girls missing (5)/(3)	(7) Expected sex ratios after hospital SRB	(8) Expected girls after elevated SRB* (1)/(7)/100	(9) Missing girls after considering elevated SRB (8)-(4)	(10) Missing girls due to sex-selective abortion (5)-(9)
0	12,254,905	105.13	11,656,803	10,965,946	690,857	.059	107.81	11,367,132	401,186	289,671
1	12,304,824	104.85	11,735,473	11,027,053	708,420	.060	107.13	11,485,881	458,828	249,592
2	12,672,092	104.79	12,092,664	11,508,503	584,161	.048	106.77	11,868,589	360,086	224,076
3	12,676,790	104.75	12,102,483	11,617,575	484,908	.040	106.72	11,878,551	260,976	223,931
4	11,140,519	104.71	10,639,806	10,270,212	369,594	.035	105.69	10,540,750	270,538	99,056
5	10,405,433	104.67	9,941,092	9,576,857	364,235	.037	105.66	9,848,034	271,177	93,058
6	9,922,498	104.64	9,482,650	9,133,580	349,070	.037	105.63	9,393,636	260,056	89,014
7	10,518,627	104.61	10,055,272	9,677,860	377,412	.038	104.61	10,055,272	377,412	0
8	11,419,500	104.58	10,919,356	10,595,842	323,514	.030	104.58	10,919,356	323,514	0
9	9,364,817	104.55	8,956,859	8,721,729	235,130	.026	104.55	8,956,859	235,130	0
10	9,956,298	104.53	9,524,717	9,267,764	256,953	.027	104.53	9,524,717	256,953	0
11	9,974,473	104.51	9,544,062	9,335,618	208,444	.022	104.51	9,544,062	208,444	0
12	9,727,202	104.49	9,309,324	9,137,476	171,848	.018	104.49	9,309,324	171,848	0
13	9,987,990	104.47	9,560,917	9,379,302	181,615	.019	104.47	9,560,917	181,615	0
14	10,537,630	104.44	10,089,479	9,922,939	166,540	.017	104.44	10,089,479	166,540	0
0-14					5,472,702				4,204,304	1,268,398

Note: "Missing girls" in this table still includes girls who may have been alive but not counted. SRB = sex ratio at birth.

\*Assumptions: Using reported hospital SRB for China of 108.0 for 1987 and 1988, 108.3 for 1989, and 109.1 for 1990, it is assumed that the SRB for each mid-1990 single year of age was:

Age in 1990	Assumed cohort SRB
0	108.7
1	108.3
2	108.0
3	108.0
4	107.0
5	107.0
6	107.0
7	106.0
8	106.0

Source: Banister 1996.

Table 5.2  
Estimated total fertility rates (per woman) for China and India, 1950-2025,  
medium variant

Period	Total fertility rate China	Total fertility rate India
1950-1955	6.2	6.0
1955-1960	5.4	5.9
1960-1965	5.9	5.8
1965-1970	6.0	5.7
1970-1975	4.8	5.4
1975-1980	2.9	4.8
1980-1985	2.4	4.8
1985-1990	2.4	4.3
1990-1995	2.2	4.1
1995-2000	2.0	3.7
2000-2005	1.9	3.3
2005-2010	1.8	2.9
2010-2015	1.8	2.5
2015-2020	1.8	2.1
2020-2025	1.8	2.1

Source: same as Table 1

Source: Roy 1993, p. 178, Table 3.

Table 5.3  
Reported sex ratio at birth in China by birth order, selected years 1982-89

Year	1st	2nd	3rd	4th+	All births
1982	106.5	105.0	109.4	111.9	107.2
1983	107.5	107.2	108.2	109.3	107.7
1984	102.1	113.6	112.6	122.2	108.3
1985	106.1	116.1	114.3	121.5	111.2
1986	105.2	116.8	123.2	124.7	112.1
1987	106.7	112.6	118.9	121.2	110.8
1989	104.9	120.9	124.6	131.7	113.8

NOTE: Data for 1988 are not available.  
SOURCES: Figures for 1982-87 are from SFPC (1990: 183-194); figures for 1989 are from SSB (1991: 461-462).

Source: Zeng et al. 1993, p. 284, Table 1.

Table 5.1  
Distribution of births by parity, 1973-87

Year	First- Order	Second- Order	Third and Higher-Order
(Percent of Total)			
1973	20.6	20.9	58.5
1974	21.9	22.3	55.9
1975	23.8	22.6	53.6
1976	26.3	23.1	50.6
1977	28.8	24.7	46.5
1978	32.4	25.1	42.5
1979	33.9	26.3	39.8
1980	37.8	27.2	35.0
1981	43.6	26.7	29.7
1982	50.1	25.3	24.7
1983	56.4	24.6	19.0
1984	55.5	25.0	19.5
1985	50.2	30.1	19.7
1986	51.2	31.5	17.3
1987	51.7	31.5	16.8

Source: Wei Jinsheng, "An Evaluation of China's Population Planning Program During the Past Decade," Ms. (December 1988).

Source: Greenhalgh 1989, p. 11, Table 2.

Table 3.11

Probability of premarital conception and percentiles of age at first marriage  
and first birth interval for ever-married women: China, 1950-88

Year of marriage	Probability of premarital conception	Percentiles of age at first marriage (years)				Percentiles of first birth interval (months) <sup>a</sup>			
		25th	50th	75th	Mean (s.d.)	25th	50th	75th	Mean (s.d.)
1950-54	.016	16.7	18.0	19.3	17.5 (1.9)	13	21	42	33.9 (31.0)
1955-59	.015	17.4	18.8	20.5	18.6 (2.4)	13	23	47	34.9 (30.4)
1960-64	.016	17.6	19.2	21.2	19.1 (2.9)	12	20	34	29.6 (26.8)
1965-69	.013	18.2	19.7	21.8	19.7 (2.9)	12	16	29	25.9 (25.4)
1970	.011	18.2	19.9	21.8	19.7 (2.9)	12	17	29	26.9 (24.3)
1971	.015	18.4	20.0	22.1	19.9 (2.9)	12	16	26	24.3 (24.0)
1972	.018	18.7	20.4	22.6	20.3 (2.8)	11	16	25	23.7 (23.0)
1973	.017	18.8	20.6	22.7	20.4 (2.9)	11	15	24	23.6 (23.8)
1974	.019	19.5	21.3	23.2	21.0 (2.8)	11	15	24	22.1 (21.2)
1975	.016	19.8	21.8	23.8	21.4 (3.0)	11	14	22	21.5 (22.3)
1976	.021	20.3	22.3	24.1	21.8 (2.7)	11	14	23	21.3 (21.9)
1977	.027	20.8	22.7	24.6	22.2 (2.9)	11	13	21	20.1 (20.9)
1978	.026	21.0	22.9	24.5	22.3 (2.9)	10	13	21	20.2 (21.6)
1979	.041	21.2	23.2	25.0	22.6 (3.0)	10	13	20	19.7 (20.6)
1980	.034	21.0	23.1	24.9	22.3 (3.0)	10	13	21	19.3 (18.1)
1981	.026	20.5	22.9	24.6	22.1 (3.0)	10	12	18	17.8 (15.7)
1982	.033	19.9	22.1	24.3	21.7 (3.1)	10	12	19	17.4 (14.4)
1983	.032	19.9	21.5	23.8	21.4 (3.0)	10	13	20	17.6 (12.7)
1984	.046	20.1	21.5	23.4	21.3 (2.9)	10	12	20	16.9 (11.1)
1985	.041	20.0	21.7	23.1	21.3 (2.6)	10	12	18	15.7 (8.5)
1986	.048	20.2	21.8	23.2	21.3 (2.4)	—	—	—	—
1987	.051	20.3	21.8	23.5	21.4 (2.5)	—	—	—	—
1988		20.2	21.9	23.7	21.5 (2.6)	—	—	—	—
All	.026	18.6	20.8	23.1	20.5 (3.2)	11	15	25	24.1 (26.1)

<sup>a</sup>For women who had been married for at least 42 months at the time of the survey.

s.d. = standard deviation.

SOURCE: Two-per-Thousand Fertility Survey of China 1988.

Source: Wang and Yang 1996, p. 303, Table 1.

Table 3.10  
Period parity progression ratios (per 1,000)  
and total fertility: China, 1979-91

Year	Progression				TF
	B-1	1-2	2-3	3* → 4*	
1979	960	937	627	445	2.88
1980	967	885	490	343	2.46
1981	983	860	519	382	2.54
1982	991	859	564	422	2.67
1983	988	768	467	354	2.30
1984	986	735	482	380	2.28
1985	980	720	430	319	2.13
1986	983	777	455	364	2.29
1987	987	811	492	389	2.43
1986	992	833	474	330	2.40
1987	992	862	482	346	2.48
1988	989	789	451	304	2.27
1989	987	764	432	349	2.24
1990	987	736	363	294	2.09
1991	984	597	255	181	1.75

*Note:* Period parity progression ratios computed from birth probabilities specific for single year of age and birth order. Total fertility computed from the formula

$$p_0 + p_0 p_1 + p_0 p_1 p_2 + p_0 p_1 p_2 p_{3+} / (1 - p_{3+})$$

where  $p_0$  denotes progression from birth of woman to birth of woman's first child (B → 1),  $p_1$  denotes progression from first to second birth (1 → 2),  $p_2$  denotes progression from second to third birth (2 → 3), and  $p_{3+}$  denotes aggregate progression from third and higher order to fourth and higher order births (3\* → 4\*).

*Source:* 1979-1987 series computed from unit record data of the 1988 two per thousand fertility survey conducted by the State Family Planning Commission. 1986-91 series computed from unit record data of the 1992 survey conducted by the State Family Planning Commission.

Source: Feeney and Yuan 1994, p. 387, Table 2.

Table 3.9  
 Period progression ratios and PPR total fertility rates for China: 1967-1987

Year	Progression and progression ratio					TFR
	B→M	M→1	1→2	2→3	3+→4+	
1987	995	968	765	466	384	2.26
1986	997	950	734	440	345	2.11
1985	996	944	678	423	312	1.97
1984	999	961	626	465	338	1.99
1983	997	963	695	465	339	2.10
1982	1000	979	821	571	404	2.58
1981	998	963	858	558	388	2.56
1980	999	960	886	562	340	2.58
1979	999	970	951	743	446	3.20
1978	996	963	969	710	442	3.16
1977	996	958	958	713	441	3.14
1976	983	970	964	808	508	3.48
1975	992	946	982	848	565	3.75
1974	992	958	985	883	672	4.33
1973	993	952	986	-	-	-
1972	973	941	984	-	-	-
1971	994	944	991	-	-	-
1970	999	952	984	-	-	-
1969	997	948	984	-	-	-
1968	998	961	988	-	-	-
1967	999	930	970	-	-	-

Calculated from birth histories collected in the National Fertility and Birth Control Survey of 1988. TFR values calculated from parity progression ratio schedule extending to progression from seventh to eighth birth. Progression from third and higher to fourth and higher is the aggregate of progression from third to fourth through progression from seventh to eighth. So few women reach these high parities, however, that the difference is entirely negligible.  
 Source: Feeney and Wang (1993:Tables 3, 5, 7, 9, and 16) and unpublished computer printouts for annual values in first column.

Source: Feeney 1994, p. 133, Table 6.5.

Table 3.6  
Annual rate of natural increase, Sichuan Province and  
total Chinese population, 1981-86 (in percent)

	1981	1982	1983	1984	1985	1986
Sichuan	1.09	0.90	0.62	0.37	0.82	1.37
All China	1.46	1.45	1.15	1.08	1.12	1.41

SOURCE: All rates are cited from Sichuan Population Census Office, 1987.

Source: Wang 1988, p. 482, Table 2.

Table 3.7  
Decomposition of changes in the crude birth rate,  
Sichuan Province, 1981-86 (per thousand)

Year	Total change	Due to age structure	Due to marriage patterns	Due to marital fertility
1981-83	-4.8 (100)	1.7 (-35.4)	-1.9 (39.6)	-4.6 (95.8)
1983-84	-2.3 (100)	0.0 (0.0)	1.1 (-47.6)	-3.4 (147.8)
1984-85	4.6 (100)	0.9 (19.6)	0.9 (19.6)	2.8 (60.9)
1985-86	5.1 (100)	1.0 (19.6)	1.0 (19.6)	3.1 (60.8)

NOTE: Figures in parentheses are percent distributions.  
SOURCES: Sichuan Population Census Office, 1983-86; 1984.

Source: Wang 1988, p. 483, Table 3.

Table 3.8  
Estimates of the contributions  $I_g$  and  $I_m$  to  $I_f$

Period	$I_f$	$I_g$		$I_m$	
1953-1960	0.4576	0.5305	81.0 %	0.8610	19.0 %
1961-1970	0.4642	0.5769	71.7 %	0.8051	28.3 %
1971-1980	0.2901	0.4115	71.3 %	0.6994	28.7 %
1953-1981	0.4039	0.5063	74.2 %	0.7885	25.8 %

Source: Cheng 1993, p. 68, Table 3.

Table 3.5  
Percentage distribution of production brigades, urban neighbourhoods,  
and all local units by proportion of first births in 1979-82

Percentage of first births in 1979-82	Rural production brigades				Urban neighbourhoods				All local areas			
	Hebei	Henan	Liaoning	Sichuan	Hebei	Henan	Liaoning	Sichuan	Hebei	Henan	Liaoning	Sichuan
0-9	0.0	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
10-19	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0
20-29	10.0	17.0	0.0	9.0	0.0	0.0	0.0	0.0	9.0	16.0	0.0	8.2
30-39	26.0	36.2	25.0	15.4	0.0	0.0	0.0	0.0	25.0	34.0	18.2	14.1
40-49	28.0	34.0	37.5	20.5	0.0	0.0	0.0	0.0	25.9	32.0	27.3	18.8
50-59	24.0	10.6	18.8	20.5	33.3	0.0	0.0	0.0	25.0	10.0	13.6	18.8
60-69	8.0	0.0	12.5	19.2	0.0	33.3	0.0	0.0	7.5	2.0	9.1	17.6
70-79	2.0	0.0	6.3	9.0	0.0	0.0	16.7	0.0	1.9	0.0	9.1	8.2
80-89	0.0	0.0	0.0	3.8	33.3	66.6	33.3	14.3	1.9	4.0	9.1	4.7
90-100	2.0	0.0	0.0	1.3	33.3	0.0	50.0	85.7	3.8	0.0	13.6	8.2
Total percentage	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of units	50	47	16	78	3	3	6	7	53	50	22	85
Percentage for province	45	37	52	49	74	72	92	92	48	38	65	52

Source: Freedman et al. 1988, p. 43, Table 2.

Table 3.4

Percentage change in total fertility for Sichuan, 1973-6 to 1979-82, by education of individual women, by illiteracy rates of their production brigades

Percentage of women aged 20-49 illiterate in production brigade	Education of individual women			
	Illiterate	Primary	Jr high +	Total
0-29	*	*	*	-61
30-39	-42	-52	-39	-48
40-59	-56	-56	-51	-56
60-79	-54	-54	-36	-56
80-100	-34	-31	-6	-35
Total rural	-53	-56	-39	-55
Total urban	-77†	-48	-23	-38
Grand total	-53	-51	-23	-55

\* Fewer than 200 woman-years of risk.

† Ages 15-29 based on fewer than 70 woman-years of risk.

Source: Freedman et al. 1988, p. 55, Table 13.

Table 3.3

Total fertility for Liaoning, by percentage illiterate in production brigade and by urban status, by education of individual women, 1973-6 and 1979-82

Percentage illiterate among women aged 20-49 in production brigade	Education of individual women			
	Illiterate	Primary	Jr high -	Total
Total fertility, 1973-6				
0-19	*	2,060	2,306	2,026
20-29	1,780	2,691	2,623	2,709
30-39	3,342	3,174	3,365	3,277
40 and over	3,629	3,488	3,562	3,456
Total rural	3,430	3,055	2,595	3,165
Total urban	1,598	1,665	1,399	1,355
Grand total	3,272	2,698	1,839	2,473
Total fertility, 1979-82				
0-19	2,020	2,155	2,445	1,882
20-29	3,096	2,647	2,162	2,340
30-39	3,266	2,470	2,180	2,435
40 and over	2,491	2,374	2,554	2,231
Total rural	2,955	2,335	2,025	2,245
Total urban	†	1,565	1,503	1,456
Grand total	2,888	2,254	1,722	1,920

\* Fewer than 200 woman-years of risk.

† Only in the age group 45-49 were there more than 25 woman-years of risk.

<sup>10</sup> Recent Chinese press articles have reported instances of deceptive reporting of birth planning statistics. The motive, according to these articles, is 'to gain honour by cheating' and 'to get monetary rewards'. See Jihua Shengyu Ban, *Birth Planning*, 'Circular on Family Planning Statistics Issued', 26 July 1985 (in *Joint Publication Research Service, China Report, Political, Sociological and Military Affairs*, No. 104, 10 October 1985, p. 4); and *Liaoning Ribao (Liaoning Daily)*, 'Yingkou city uncovers deceptive birth control reports' (in *Joint Publication Research Service, China Report, Political, Sociological and Military Affairs*, No. 116, 29 November 1985, pp. 88-9).

Source: Freedman et al. 1988, p. 51, Table 10.

Table 3.2.

## Selected Fertility-Related Indicators by Province, China, 1993

Province	Crude Birth Rate	Rate of Natural Increase	Total Fertility Rate*	Acceptance Rate of One-Child Certificate (%)
All China	18.09	11.45	2.253	19.09
Beijing	9.35	3.19	1.332	57.16
Tianjin	10.71	4.51	1.661	52.20
Hebei	15.43	9.32	2.331	11.42
Shanxi	17.48	11.12	2.461	9.90
Inner Mongolia	18.48	11.65	1.967	13.13
Liaoning	12.43	6.32	1.506	40.48
Jilin	15.28	8.97	1.806	27.38
Heilongjiang	15.90	10.38	1.713	28.93
Shanghai	6.50	-0.80	1.344	70.13
Jiangsu	13.97	7.36	1.939	42.52
Zhejiang	13.61	7.03	1.404	23.72
Anhui	17.18	10.67	2.511	10.08
Fujian	16.72	11.10	2.362	11.09
Jiangxi	20.33	13.44	2.460	8.56
Shandong	10.47	3.71	2.124	21.85
Henan	15.87	9.76	2.897	8.68
Hubei	20.04	13.11	2.496	15.62
Hunan	14.08	6.95	2.397	10.08
Guangdong	18.34	12.50	2.512	0.70
Guangxi	19.58	13.23	2.727	6.78
Hainan	20.81	15.55	2.932	8.00
Sichuan	16.77	9.56	1.758	32.18
Guizhou	22.60	14.10	2.963	6.23
Yunnan	22.00	13.90	2.588	7.99
Xizang	26.68	19.08	4.222	NA
Shaanxi	17.63	11.08	2.705	12.18
Gansu	20.16	13.32	2.34	8.01
Qinghai	20.5	12.24	2.468	10.51
Ningxia	19.43	14.07	2.614	11.57
Xinjiang	21.53	13.85	3.157	12.61

\* 1989

Source: China Population Data Sheet, 1994, China Population Today, December, 1994: 17-20.

Table 3.1  
Total fertility rates and mean age at marriage for China,  
various sources and calculations: 1965-1987.

Year	ASBR TFR		Mean age at marriage			PPPR TFR		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1987	—	2.46	—	21.8	22.0	—	2.33	2.26
1986	—	2.33	—	21.8	21.8	—	2.17	2.11
1985	—	2.27	—	21.7	22.0	—	2.07	1.97
1984	—	2.35	—	21.7	22.1	—	2.06	1.99
1983	—	2.53	—	21.8	22.1	—	2.32	2.10
1982	—	2.83	—	22.1	21.9	—	2.63	2.58
1981	2.71	2.41	22.8	22.6	22.0	2.65	2.61	2.56
1980	2.32	2.55	23.0	22.8	22.4	2.70	2.90	2.58
1979	2.80	2.77	23.1	23.0	23.0	3.20	3.14	3.20
1978	2.75	2.72	22.8	22.8	23.2	3.16	3.14	3.16
1977	2.87	3.09	22.5	22.6	23.4	3.23	3.40	3.14
1976	3.25	3.30	22.3	22.3	23.1	3.47	3.52	3.48
1975	3.58	3.80	21.7	22.0	23.2	3.73	3.93	3.75
1974	4.15	4.24	21.4	21.5	22.8	4.14	4.33	4.33
1973	4.51	4.72	21.0	21.1	22.5	4.37	4.69	—
1972	4.92	—	20.6	20.7	22.2	4.73	4.85	—
1971	5.40	—	20.3	20.4	21.9	5.08	—	—
1970	5.75	—	20.2	20.3	21.1	5.43	—	—
1969	5.67	—	20.3	20.4	20.8	5.41	—	—
1968	6.37	—	20.1	20.2	20.6	5.68	—	—
1967	5.25	—	20.0	20.2	21.0	4.98	—	—
1966	6.21	—	19.8	—	—	5.75	—	—
1965	6.02	—	19.7	—	—	5.96	—	—

Values in columns 2 and 7 refer to years ending June 30 of each year. Other values refer to calendar years.

Sources: column 1 from Coale and Chen (1987, Basic Table 1.A.:25); column 2 from Luther *et al.* (1990, Table 4:350); column 3 from Banister (1987, Table 6.1:156); column 4 from unpublished computer printouts of the 1988 Two-per-Thousand Survey; column 5 from Feeney and Wang (1993, Table 2:69); column 6 from Feeney and Yu (1987, Table 1:81); column 7 from Luther *et al.* (1990, Table 5:353); column 8 from Feeney and Wang (1993, Table 2:69).

Source: Feeney 1994, p. 123, Table 6.3.

Table 2.5  
 Infant mortality rates based on the mother's occupation.  
 Ethnic background and educational level (‰)

		1975-1979	1980-1984	1985-1987
Occupation	Farmer	50.44	44.26	42.15
	Worker	20.70	17.92	16.01
	Civil servant	15.47	8.27	12.46
Ethnicity	Han	41.00	36.23	32.43
	Other	74.54	65.03	74.33
Education	Illiterate	53.44	47.63	44.35
	Semi-literate	52.38	50.78	50.71
	Elementary school	42.36	45.05	47.25
	Junior high school	29.36	30.22	31.72
	Senior high school	26.15	21.34	23.30

(from 1988 2/1000 data)

Source: Weng and Wang 1993, p. 78, Table 3.

Table 2.6  
 Neonatal, post-neonatal and child mortality and the sex ratios of mortality in Shaanxi.  
 Liaoning and Guangdong Provinces. China. 1950-1987

	Neonatal (<1 month)			Post-neonatal (1-11 months)			Childhood (12-59 months)		
	M	F	Ratio	M	F	Ratio	M	F	Ratio
Total	36.9	30.1	1.23	14.3	11.3	1.21	11.1	12.3	0.90
Urban	25.2	21.1	1.19	11.1	9.01	1.23	3.6	3.4	1.02
Rural	41.1	33.2	1.24	15.4	12.3	1.20	12.3	14.0	0.87
<i>Provinces</i>									
Shaanxi	52.5	40.8	1.28	22.1	18.4	1.20	17.3	20.3	0.86
Liaoning	32.0	24.7	1.30	11.3	9.0	1.31	6.4	7.0	0.91
Guangdong	30.4	27.2	1.12	11.0	9.6	1.15	10.3	11.1	0.93
<i>Year of birth</i>									
≤ 1964	67.5	51.0	1.32	30.5	30.0	1.02	24.0	35.9	0.67
1965-69	45.7	37.4	1.22	17.5	11.3	1.55	15.6	16.4	0.95
1970-74	35.6	25.6	1.39	15.4	10.9	1.41	12.4	11.3	1.05
1975-79	31.0	26.0	1.19	11.3	6.6	1.79	3.0	3.3	0.96
≥ 1980	24.7	23.3	1.06	6.7	3.0	0.84	4.3	4.0	1.20

\* Neonatal and post-neonatal mortality rate per 1000 live births; child mortality rate per 1000 population in the age group 1-4.

Source: Ren 1995, p. 1262, Table 2.

Table 2.4  
Indirect Estimation of Infant Mortality for China, 1968-80

Age of woman	Children ever born		Children surviving		Proportion dead	Estimated infant mortality rate <sup>a</sup>	Reference date of infant mortality estimate <sup>b</sup>
	Total women	Total	Number per woman	Total			
20-24	36,378,430	15,292,480	0.420	14,342,800	0.062	53	1980.8
25-29	44,744,640	71,271,910	1.593	66,731,380	0.064	45	1979.1
30-34	34,995,810	96,684,880	2.763	89,393,640	0.075	48	1977.2
35-39	25,605,300	97,357,860	3.802	87,864,560	0.098	57	1974.8
40-44	22,540,230	104,670,870	4.644	91,780,400	0.123	68	1971.9
45-49	22,272,080	119,535,340	5.367	100,789,590	0.157	80	1968.7

SOURCES: State Council Population Office (1983): 438-39; Griffith Feeney, "Estimating Infant Mortality Trends from Child Survivorship Data," PS 34, no. 1 (Mar. 1980): 109-28; Feeney, "Addendum to Estimating Infant Mortality Trends from Child Survivorship Data," Apr. 1982, unpublished; Feeney, "Mortality Estimation from Child Survivorship Data: A Review," in Thomas M. McDevitt, ed., *The Survey Under Difficult Conditions*, forthcoming.

NOTE: The Feeney infant mortality technique was used to derive estimates of infant mortality from 1982 census data on children ever born and children surviving by age of mother.

<sup>a</sup>Per 1,000 births.

<sup>b</sup>The decimal place refers to tenths of a year. For example, 1980.8 means about Oct. 19, 1980. But since this is an indirect estimation procedure, the reference date cannot be so exact.

Source: Banister 1987, p. 108, Table 4.14.

Table 2.3  
Infant Mortality Rate

(1954–1981)

YEAR	INFANT MORTALITY (‰)
1954	138.5
1956	81.1
1957	70.9
1958	80.8
Cities	50.8
Counties	89.1
1959	88.3
1963	83.6
1973–75	47.0
Male	50.1
Female	43.7
1975	27.1
1978	22.3
1981	34.7
Male	35.6
Female	33.7

Sources: Jiang Zhenghau et al., "Initial Study of the Life Expectancy of China's Population," *Population and Economy*, No. 3, 1984; p. 16, *Renmin Ribao*, March 25, 1984.

Source: New China's Population, p. 37, Table 4-10.

Table 2.2  
China, Mortality Trends as Reported, 1973-75 to 1990

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MALE	Central death rates m(x) as reported			Percent change, unadjusted data		
Age	1973-75	1981	1990	1973-75 to 1981	1981 to 1990	1973-75 to 1990
-----						
0	0.05097	0.03940	0.02901	-23	-26	-43
1-4	0.00906	0.00400	0.00235	-56	-41	-74
5-9	0.00231	0.00128	0.00077	-45	-40	-67
10-14	0.00101	0.00078	0.00061	-23	-22	-40
15-19	0.00110	0.00106	0.00103	-4	-3	-6
20-24	0.00148	0.00142	0.00139	-4	-2	-6
25-29	0.00157	0.00146	0.00139	-7	-5	-12
30-34	0.00200	0.00176	0.00178	-12	1	-11
35-39	0.00286	0.00243	0.00225	-15	-7	-21
40-44	0.00411	0.00351	0.00329	-15	-6	-20
45-49	0.00622	0.00535	0.00518	-14	-3	-17
50-54	0.00985	0.00873	0.00836	-11	-4	-15
55-59	0.01539	0.01434	0.01371	-7	-4	-11
60-64	0.02532	0.02444	0.02358	-3	-4	-7
65-69	0.03763	0.03830	0.03818	2	-0	1
70-74	0.06064	0.06357	0.06348	5	-0	5
75-79	0.09478	0.09639	0.09832	2	2	4
80-84	0.14575	0.15634	0.15557	7	-0	7
85+	0.23697	0.23725	0.23095	0	-3	-3
-----						
FEMALE	Central death rates m(x) as reported			Percent change, unadjusted data		
Age	1973-75	1981	1990	1973-75 to 1981	1981 to 1990	1973-75 to 1990
-----						
0	0.04435	0.03726	0.03371	-16	-10	-24
1-4	0.00928	0.00444	0.00248	-52	-44	-73
5-9	0.00211	0.00105	0.00060	-50	-43	-72
10-14	0.00085	0.00065	0.00045	-23	-31	-47
15-19	0.00096	0.00092	0.00086	-4	-7	-10
20-24	0.00146	0.00134	0.00121	-8	-10	-17
25-29	0.00171	0.00148	0.00119	-13	-20	-30
30-34	0.00208	0.00168	0.00134	-19	-20	-36
35-39	0.00280	0.00216	0.00160	-23	-26	-43
40-44	0.00374	0.00291	0.00230	-22	-21	-39
45-49	0.00512	0.00421	0.00365	-18	-13	-29
50-54	0.00776	0.00659	0.00578	-15	-12	-25
55-59	0.01153	0.01018	0.00908	-12	-11	-21
60-64	0.01916	0.01713	0.01540	-11	-10	-20
65-69	0.02886	0.02685	0.02555	-7	-5	-11
70-74	0.04627	0.04583	0.04370	-1	-5	-6
75-79	0.07258	0.07062	0.06996	-3	-1	-4
80-84	0.11275	0.12107	0.11664	7	-4	3
85+	0.19920	0.19991	0.19008	0	-5	-5
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Sources: Appendix Tables A-1, A-2, A-3, A-4, A-5, and A-6.

Source: Banister 1992.

Table 2.1

Crude death rates in China, 1949-1992

Year	Official	Roughly corrected <sup>1</sup>	Year	Official	Roughly corrected <sup>1</sup>
1949	20.00		1971	7.32	8.6
1950	18.00		1972	7.61	8.9
1951	17.80		1973	7.04	8.3
1952	17.00		1974	7.34	8.6
1953	14.00	22.5	1975	7.32	8.6
1954	13.18	29.1	1976	7.25	8.5
1955	12.28	22.4	1977	6.87	8.1
1956	11.40	20.8	1978	6.25	7.3
1957	10.80	19.0	1979	6.21	7.3
1958	11.98	20.4	1980	6.34	7.3
1959	14.59	23.3	1981	6.36	7.3
1960	25.43	38.8	1982	6.60	
1961	14.24	20.5	1983	6.90	
1962	10.02	13.7	1984	6.82	
1963	10.04	13.0	1985	6.78	
1964	11.50	13.5	1986	6.86	
1965	9.50	11.1	1987	6.72	
1966	8.83	10.4	1988	6.64	
1967	8.43	9.9	1989	6.54	
1968	8.21	9.6	1990	6.67	
1969	8.03	9.4	1991	6.70	
1970	7.60	8.9	1992	6.64	

1. Available for 1953-1981 only.

Source: Official: SFPC, 1994, Annex III. Corrected: Coale, 1984, Table 10.



One of the lessons we have learned from China's birth planning program is the kinds of unintentional consequences that accompany fertility control programs. In China, with its strong patriarchal culture, the gendered nature of these policies is particularly clear in the consequences endured by girls. But similar unintentional consequences exist throughout the world, in the ways that groups--gender or ethnic, for example--are differently affected by family planning programs.

The demographic future of China remains uncertain, although its recent record in fertility and mortality declines makes that future less uncertain than it was only twenty years ago. Still, several factors make it inevitable that China will be a major player in world population dynamics. China's population size, its political and economic clout in the international scene, and the potential stabilizing and destabilizing effects of population change in China make it worth watching today and long into the future as well.

Migration, for example, is both the consequence and cause of a variety of social and economic changes, and deserves the attention of demographers and policy makers alike.

There is room for still further work on the consequences of population changes. Social changes such as changes within families and households, the effects of decreasing size of cohorts on such things as educational or job opportunities, and the effects on gender inequalities and women's lives are all areas that deserve further study. At the macro level, it will be important to continue and expand studies on the environmental consequences of demographic change, and the availability of resources such as food or water for the growing population. Particularly interesting will be monitoring how demographic changes interact with economic reforms to affect individual or macro-level social life.

We can expect that large scale data collection will continue, partly fueled by the government's interest in monitoring its birth planning program. These data collections will provide the government, the demographic community, and other interested parties with the necessary data to give an accurate picture of China's current population situation. At the same time, wider use of Chinese population data and less dramatic population changes in the future may mean that research will be less dominated by analyses evaluating the birth planning program, which has been the case until now. Especially important will be studies designed to understand the social and economic causes and consequences of population change. Such studies need to include a broader range of variables and measures than are included in the large scale fertility surveys that are currently the basis of so much of our knowledge of China's population. Surveys designed to measure a broad range of social aspects rather than focused on population changes are likely not only to provide useful information on the society, but will allow better understanding of demographic changes as well. The increasing numbers of ethnographic studies taking place across China are particularly likely to give a picture of China's social changes that is richer and deeper than currently available.

The study of China's population has given demographic scholars important insights. From observing the enormous changes, demographers have been able to learn a great deal about population dynamics. Some of the changes, such as rapid fertility decline or the effects of changing age structure, have provided the demography community with something akin to a natural experiment.

The demography and family planning communities have also learned much from the process of China's birth planning program. Evaluations of the program have revealed the successes and limitations of such a program. Particularly clear are the ways that such a program can reduce fertility even in the absence of social and economic change. But also clear is the importance of the cultural and political context of this program; its successes and limitations are rooted in a society where state involvement in daily life is common. Such a program is less likely to work in other kinds of societies, where reproduction is considered a strictly personal decision.

from fertility. It is likely that fertility will remain low, but just how low is not easy to predict. Measures of preferences indicate that couples want fewer children than they did even a decade ago, but most still want at least two. That suggests the importance of the birth planning program and its fertility restrictions to future population size and growth. Even assuming that some form of the current program stays in place, the exact fertility limit that is placed on couples is not predictable, as this has varied from year to year and place to place since the start of the program.

It is unlikely there will be major program changes. China is one of the few countries where the responsibility of citizens to use of birth control is part of the country's constitution. What is more likely to happen is that program and policies will continue to be adjusted, perhaps as China's leaders balance period and cohort fluctuations (Gu and Yang 1991; Li 1989). Also likely is that the small-family ideal will become more and more accepted, although that doesn't not necessarily mean that most parents will prefer only one child. When the current birth planning policy was first put in place, the state had said it was to be a temporary program until population momentum slowed; it will be interesting to watch future policy in this regard. It is unlikely that fertility will increase dramatically, but given the size of China's population, even small fertility increases will have dramatic effects.

Although there is no indication that the government of China intends to make far-reaching changes in its population goals or program, it is possible that the government will make efforts to correct some consequences which are at least associated, if not caused, by the policy. The issue of the missing girls has received widespread attention both within and outside China; the government has formally acknowledged the need to address the situation, through efforts such as attempts to control sex-selective abortions and through recent resolutions, such as that passed in 1995 which was intended to deal with the continuing inequalities women face. Many have argued that the lower son preference found in urban areas is partly a result of the pension programs which make it less necessary for parents to rely on sons in old age. The government could begin an effort to change fertility preferences through structural changes such as the provision of pensions in rural areas, although the cost of such a program makes it less likely to be in place in the near future. And given the experiences of other societies such as Korea, it is unfortunately true that imbalances in the sex ratio at birth are likely to continue for some time.

### *Demographic Studies*

Interest in China's population experiences remains strong, and the size of the population and continued potential for change suggests that that interest is not likely to abate soon. It may be that future changes will not be as dramatic as those in the recent past. But potential social, economic and political changes in the near future may interact with any population changes and make interesting demographic study.

such a high value on large, extended families (Potter and Potter 1990). The next generation, who will grow up without aunts and uncles will experience a different family life as well (Bongaarts and Greenhalgh 1985).

Marriage age has increased in recent decades, but expectations that unmarried children live with their parents until marriage still prevails. Thus, children spend longer with their parents; this is especially new for girls, who traditionally married young and moved to their husbands' families at marriage. Now, however, daughters are spending longer with their parents, and parent-child relations are necessarily undergoing change. Reports suggest that relations between daughters and their parents have been strengthened partly because of the longer time they spend together, and that these relationships are now more likely to continue after the daughters marry (Wolf 1985, p. 190ff).

Increased migration is also affecting families, as young people move away from their families in order to take jobs in other areas. Indeed, it is the pull of urban jobs that has been the key factor in the increasing numbers of female headed households in rural areas (Judd 1995). Migration is likely to break up households in ways that are largely determined not by internal factors such as family harmony or size, as in the past, but by the pressures and attractions of the external market.

The findings of these and other researchers remind us that Chinese families may increase or decrease in size or complexity not necessarily in direct response to a birth planning policy which has pushed the number of children born downward. Rather, family size and structure will depend on both population policies and such social factors as housing availability, availability of social services (such as care for aged and pensions), the preferences of and social pressures faced by parents and children, and the changing face of the economy.

### *Population Size and Growth*

How fast China's population will grow is, of course, difficult to predict, although some elements of future demographic change are easier to foresee. The contribution of mortality to overall changes in population size or growth rates is apt to be small. Mortality rates are already quite low. There are likely to be some mortality changes; rural mortality may decline, with the continuing development of health, disease control, and public health programs, although that will happen only if health care remains accessible and affordable even after economic reforms. Even as some diseases are brought under closer control, others may increase. AIDS has made some inroads in parts of China, especially in those areas where the drug trade is prevalent; presently, however, the number of AIDS cases in China remains small (Chin 1995). Death rates due to lung cancer are likely to rise because larger personal incomes and other factors have led to large increases in the proportion of the population who smoke cigarettes.

The biggest contribution to China's population growth, of course, will be

proportion of joint families in a population, since earlier marriage means earlier childbearing, and consequently a greater chance that three generations would be alive at same time. Third, the size of the "brother set" could affect proportions of stem and nuclear families: assuming that most families divide before the death of the parents, fewer brothers means fewer nuclear families. Of course, these demographic influences might be mediated, offset or exaggerated by other social and economic changes.

Two other pieces from the Davis and Harrell collection, Davis (1993) on urban households under the recent state regime and especially Unger (1993) on urban families in the 1980s, are particularly relevant when considering the family-level consequences of population change. Unger, bringing together the results of 35 Chinese surveys conducted between 1982 and 1986, found that while nearly two-thirds of urban households were nuclear, nearly a quarter were stem. Like other researchers (see Wu 1991), Unger did not find a definite trend in the direction of increasing numbers of nuclear families. Several factors accounted for the continuing presence of a large proportion of stem families. Housing shortages forced young married couples to reside with parents until separate housing could be found. Delayed marriage among those youths sent down to the countryside during the 1970s also had an impact on family structure.

One of the important findings of both Unger and Davis was the effect of life cycle stage on family arrangements. As Stevan Harrell argues with regard to families in the rural southwest, "Demographic factors will determine the personnel available for the formation of stem and joint families, while various other social factors will influence the perceived balance between the advantages and disadvantages of staying together or splitting apart...In addition, any convincing look at variation from demographic or social factors must consider interaction between these factors" (1993, p. 79).

Zeng (1986) uses simulation methods to understand how demographic change might influence family size and type, and demonstrates that family type really depends on "the number of adult children per older couple and on the propensity for older couples and one of their married children to live together" (p. 683). Especially significant is the effect of a continuing fertility decline (to below replacement level): when the number of members of the children's generation is smaller than that of the parents' generation, some parents will have to live apart from children even if they prefer not to; such a situation might mean an increase in nuclear families, because many old couples would not have an adult child to live with.

Other demographic changes may affect Chinese families in other ways. Fertility below replacement (e.g. one-child families) not only means smaller families, but has profound effects on family members and the society as a whole. China is one of the few societies facing a possible future of a generation of only children, which is an especially significant change in a society which has placed

been on campaigns to get both sons and daughters to provide parental care.

We can expect there to be differences in population structure and ageing in rural and urban areas, because of the current differences in fertility rates. In spite of the effect of the migration of primarily young people into the cities, the lower fertility rates in urban areas will mean cities will have a higher aging rate than rural areas (Wu 1991, p. 44). State support for the elderly is more widely available in urban than rural areas. Thus, continuing higher rural fertility rates may help to alleviate some of the pressure on younger generations for elderly support in those areas where nearly all elderly care occurs in the family.

### *Family Size and Structure*

Even without the enormous social, economic and political changes that have occurred in the last half century in China, the demographic changes that have taken place have affected families in fundamental and far-reaching ways. In fact, some of the most immediate and major consequences of any population policy or change will be felt at the family level. Family size and structure are affected both by changes in mortality which have improved the chances that children will survive until adulthood and by the extended life spans of the eldest generation as well. Birth planning policies have affected the number of children growing up in any family and thus the relative proportion of members of different cohorts, such as the elderly. Grandparents are now much more likely to be alive at the same time as their grandchildren.

Research that has dealt specifically with these issues underscores just how much variety there has been in the way families have changed as a consequence of demographic changes. With the expansion in the methods that demographers employ and with the greater opportunities for fieldwork on the part of foreign and Chinese scholars, there has been an increasing number of works providing insights into the most micro levels of population change, and giving the kind of rich social and cultural context which we need if we are to understand population change in any depth. We can only touch on some of the kinds of the research being done in this area.

One of the best collections on family change is that edited by Davis and Harrell (1993); several pieces describe the way that Chinese families have experienced complex and various changes, including the ways that they have dealt with the sometimes conflicting forces of birth planning policies and economic reforms.

Harrell (1993) discusses three ways that demographic change might affect family complexity--size and structure of family--in a society like China. First, all things being equal, if the eldest generation lives longer, there will be a higher proportion of stem or joint families, because there will be higher probability of three generations alive at once. Second, a decline in the age at marriage affects the

## 6. THE FUTURE

What will be the effects of China's past and projected demographic changes? Some clues come from the ways Chinese society has already been affected by those demographic changes that have already taken place.

### *Age Structure and Population Ageing*

The kinds of changes the shape of the population structure has undergone and will undergo are dramatically pictured in China's population pyramids (Figure 6.1 through 6.8). In these figures, one can see the effects of such events as the Great Leap Forward in the late 1950s, which caused dramatic shrinking of the cohorts born at that time. Even more important have been the effects of mortality and especially fertility declines on the shape of the population. In 1953, with fertility levels still high and mortality just beginning to fall, the population structure had a classic "pre-transition" shape, with a wide base and narrow top. The 1964 pyramid reflects the continuing high levels of fertility found in China generally, but also the dramatic demographic impacts of the Great Leap Forward, when fertility dropped sharply for several years, and mortality further depleted the numbers in the young cohorts. By 1982, the impact of fertility decline is clearly seen in the narrowing of the base of the pyramid; that effect is even more dramatic in 1987.

The effects of this changing age structure are perhaps most pronounced in the ageing of the population that is occurring because of these dramatic fertility declines (see Wu 1991 for a thorough review of the issues of the aging of China's population). The proportion of the population over age 60 increased from just over 7 percent in 1953 to 8.5 percent in 1987, and is projected to increase to over 10 percent by 2000 and to over 22 percent by 2040 (see Table 6.1 and Figure 6.9). Because of these changes, different segments of the population are growing at different rates. Figure 6.10 contrasts the growth rates of the total population and the population aged 60 and over, showing the dramatic decline of the first and the increases in the second.

One effect of such rapid ageing of a population means that dependency ratios will change. Fewer young people will have to support the country's growing elderly population. In a society like China, where much of this support is provided through the family, young people are likely to feel the strain of these demographic changes. In fact, many have discussed one of the consequences of a one-child policy: as only children, married couples will have to take responsibility for both husband's and wife's parents in their old age. Given the increases in life expectancy, the length of time for which children will be caring for their parents is also likely to increase. It is possible that the government will begin to provide wider and better care of the elderly than it does presently, but currently, emphasis has

controversial policy is a worthwhile goal in itself, even as other policies might focus on such issues as gender discrimination or the problems of an ageing population.

the demographic means of achieving the demographic goals, but social and economic change which might either accompany a program or reduce the need for such a stringent one. One of the most comprehensive of these approaches is that by Johnson (1994). He argues that if China were to seek changes in three institutions in rural areas, fertility would decline even without such a strong birth planning program. Promoting and supporting education for girls in rural areas, changing current policies which reallocate land in villages in response to family size, and the provision of social security and retirement pensions would go far in reducing the perceived and actual need for children, and particularly sons (see also Sen 1994).

Some scholars have pointed out that the current system actually fosters gender discrimination. Lavelly (1988) argues that because it is families with girls who are more likely to violate birth quotas (because they are the ones with the most incentive to go on to try to have a boy as a second or third child), and are the ones who will be punished for those violations, it will actually be girls (rather than boys) who bear a larger brunt of the disincentives. Smaller land allocation, lower rations, or lower priority in school or job assignments are thus all more likely to be experienced by families with girls than by one child families, which are likely to be boy-only families.

The provisions in the birth planning policies since the mid 1980s which allowed daughter-only households (*dunuhu*) in rural areas to have a second child can be seen as accommodating the desires of the peasants. But such a change can also be seen as the state's public recognition of "the unequal value of daughters and sons ...[in the way that it...] made the gender of the first child a legitimate basis for reproductive behavior. The legalization of gender inequality was in direct contravention to the Chinese constitutions, which holds men and women to be equal before the law" (Greenhalgh and Li 1995, p. 625). These authors go on to argue, "Thus,... son preference moved from being a peasant value (deeply embedded, of course, in social institutions) to becoming a component of informal reproductive policy in the villages, to being incorporated into the formal population policy of the province" (p. 627).

Among demographers and others writing about China, there is obvious interest in finding alternatives to the current birth planning policy. Although some question the specific demographic goals of the Chinese government, few question the need for China to reduce population growth. From the attention and interest evident in the literature, it is clear that many are uncomfortable with the current policy, whether because of the difficulties of implementing such a restrictive policy, the demographic consequences of the current focus, or the social changes that have accompanied demographic change. Particularly key to the latter concerns are ones about treatment of girls and women. Whether or not a two child policy would reduce discrimination against girls or reduce the sex ratio at birth is not clear, given the presence of such discrimination in other societies without such policies. But for many demographers, finding alternatives to what many see as a difficult and

Bongaarts and Greenhalgh argue that a better policy, one with the same demographic goals but different means to those goals, would work better and have fewer negative consequences. They propose a policy that would allow all couples two (and only two) children, but would require a minimum age of at least 25 for the first birth, combined with a spacing interval of several years between the first and second births. Such a policy would allow China to reach its goal (see Figure 5.2) but with less social or political upheaval. Although not providing as much detail, other demographers have agreed that a two-child with spacing rule would be as effective as the current one child policy (Wang 1988; Zeng et al 1993).

Li (1989) argues that recent economic reforms will make the one-child policy increasingly difficult to enforce. He also argues that the relationship between population and resources is not clear or fixed, especially in an increasingly interdependent world. In addition, he points to the difficulties created by "severe age irregularities" in any population. He proposes a policy which would be less focused on ultimate population size but would instead allow a "constant stream of births," thereby ensuring a smooth age distribution and less social and economic difficulties in future years. "Instead of regulating how many children each couple can have in their lifetime, the government should try to regulate the timing of childbearing according to the size of each cohort, encourage couples to have their first baby later, and promote a longer interval between first and second births" (p. 293). He suggests a policy that would allow 20 million births to occur annually; in this scenario, all cohorts would have a TFR of 2.20, and the mean age of fertility would be adjusted accordingly for each cohort (large cohorts would delay the onset of childbearing).

Gu and Yang (1991) go even further to suggest serious consequences with the recent and current focus of birth planning policies on cohort instead of period fertility. It was because of the focus on cohort fertility, they argue, that China experienced "birth bunching," which occurs when more than one cohort goes through birth events at the same time; attention was focused on the numbers of children individual women had, and less attention was paid to age at marriage and age at first birth. Declines in age at marriage and birth intervals caused "birth bunching," which pushed the period fertility rates up even as the cohort rates remained fairly stable. Gu and Yang advocate refocusing policies to take into account the principles embodied in many of the suggested alternative policies (e.g. Bongaarts and Greenhalgh 1987). The essence of their proposals is that, as far as the period growth of population is concerned, it matters not only how many children a couple has in their lifetime, but also when the couple marries and when they have their children. In other words, not only can shao (fewer) contribute to the period effect of population growth but wan (later) and xi (longer) can as well" p. 25. Now that fertility has fallen to the current low levels, timing of marriage and childbearing will become increasingly important to levels of fertility.

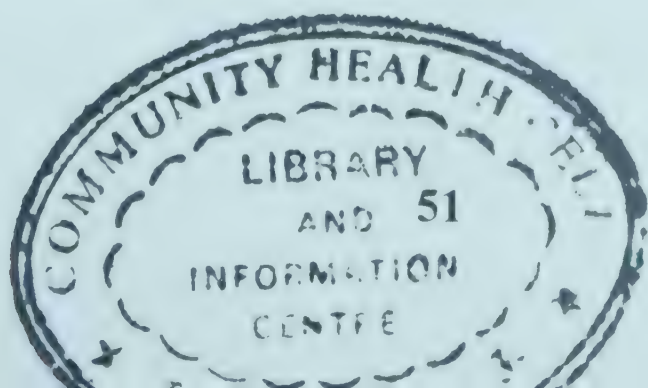
Other scholars have pointed to the ways that the Chinese state might reduce some of the negative consequences of the current program. Their focus is not on

program implementation and the strength and extent of the program that was put in place was the belief by many government leaders that population growth would cause terrible consequences to the nation as a whole and would prevent China from achieving economic success or even stability.

Lester Brown is a strong supporter of programs to reduce population growth, and someone who believes that even with the current fertility restrictions, China's population growth will put enormous pressure on the earth's carrying capacity. He puts a positive spin on the decisions of early Chinese leaders. "As Chinese leaders analyzed future population, land, and water trends some 20 years ago, they realized that they had to choose between the reproductive rights of the current generation and the survival rights of the next generation. What separates the government in Beijing from those in many other countries is that it is desperately trying to protect the options of the next generation, politically difficult though that may be" (1996, p. 35). An alternative perspective comes from Banister (1987). "... the people of China can and should be allowed complete voluntarism in family planning, even if it means that the population growth rate is over 1.5 percent annually for the next two decades. This phenomenon is a natural and temporary result of the current age structure, and there is no justification for panic. China's situation is not nearly as desperate as it appears to the current leadership" (p. 217).

Rather than argue about whether China's population puts that country and the world in great danger, we could reframe the question: if we concede the need to restrict population growth in China, are there alternatives to the current program? Several demographers have provided some interesting answers to this question. Bongaarts and Greenhalgh (1985) argue that the current population goal (of around 1.2 billion by 2000) could be achieved using a two child policy with delayed childbearing. Using various assumptions, they project China's population (see Figure 5.1)), showing that no policy would indeed imply a very high growth rate and ultimate population, while a policy like the later, longer, fewer (wanxishao) would reduce population growth, but not by the amount wanted by the Chinese government. Their projections show that the one child policy would indeed allow China to reach its goal (if the one child limit really was achieved).

But there have been great social, economic and cultural consequences of the one child policy that really became apparent only after the policy was in place. In addition to problems such as the ageing of population, the problems associated with a society of so many only children and gender inequality, Bongaarts and Greenhalgh mention other issues which have received less attention. They discuss the kinds of changes that couples, individuals, and families have to undergo during the quite sudden change to one-child families. One child restrictions mean that half of couples will be unable to fulfil their duty to carry on their descent line and intergenerational responsibilities are likely to be disturbed. "If the one child policy removes these basic cultural bearings before alternative belief systems are in place, it may produce a kind of cultural disorientation whose broader effects are hard to predict" (p. 596; see also Potter and Potter 1990).



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aborted fetuses is much lower for those whose mothers had no surviving sons; for those with at least one son, the sex ratio of the fetuses is much higher.

So, although there may not be definitive answers about the exact numbers and fate of the missing girls, there is little doubt about the existence of the phenomenon and possible underlying causes. But what is the connection between the missing girls and the population planning program? That the increases in SRBs coincided with the intensification of the programs suggests a connection. Indeed, the restrictions placed on couples about the number of children they could have must have entered into any decisions parents made about ways to shape their families within those constraints. However, drawing a straight line between high SRBs and the population planning program is complicated when we look at the experience of neighboring populations, ones without such programs.

In an article that is likely to force us to re-think some of the earlier arguments about the missing girls, Gu and Roy (1995) compare SRBs in Korea, Taiwan, and Mainland China (see Table 5.6). The SRB is higher than normal in all three populations. And these societies share other features as well; all have shown strong preference for sons, both in the past and in modern times. All three have gone through rapid fertility declines which coincided with the increase in sex ratios, and SRBs increased at about the same time in all three populations (in the mid 1980s). Gu and Roy attribute these high SRBs to the combination of rapidly falling fertility, continuing preference for sons, and the availability of technology to detect the sex of the fetus. As Banister (1995) argues, "In areas where there is little or no son preference, fertility decline does not bring it on. But where son preference existed alongside high to moderately high fertility, even a modest decline in fertility may exacerbate the existing discrimination against female babies, children, and now fetuses" (Banister 1995, quoted in Gu and Roy 1995, p. 32).

So it might be more accurate to attribute the treatment of girls to the declining fertility which in turn was induced and strongly promoted by the state's family planning program. This does not change the current, quite dire, situation. But it does suggest that higher-than-normal SRBs might have occurred even if fertility declined not because of the state's birth planning program but because of socio-economic changes and/or a scaled-down program. Nevertheless, the program does seem implicated in several ways. Researchers have found that girls fared better before policy implementation and during more lenient policy periods, and less well during the early (strict) years and early 1990s (Greenhalgh and Li 1995; Ren 1995a; Coale and Banister 1994). A second issue is whether the state, as powerful as it is in China, might have done something that could have prevented some of the negative consequences of the program.

### Alternatives to the Current Program

To answer these kinds of questions, we can draw on the research of those who have attempted to evaluate the program and whether it has been necessary given the possible outcomes of rapid population growth. Again, the major reason for the

technically, higher female infant mortality rates should not be related to sex ratios at birth, if the deaths and the previous births of girl children are not reported, that would influence the SRB.

Abandonment of female infants and children also plays a role, although again the extent is not easily quantifiable. Recent work on infant abandonment (Johnson 1996) indicates that girls are being abandoned in greater numbers (and most infant abandonment involves girls; boys are rarely abandoned). Their survival after abandonment is questionable; some eventually end up in state-run institutions, but many more likely die before they reach those doors. Even those that are taken in by the state do not necessarily fare well; whether because of their health status upon arrival or because of the quality of care after they arrive, the death rates at those institutions are quite high, and many of these children die before reaching childhood.

One of the most likely causes of the skewed sex ratios at birth is increasing use of prenatal sex determination and subsequent sex-selective abortion. Zeng et al. (1994) argue that this practice and the underreporting of female births together account for nearly all of the missing girls. Whether that is true remains in dispute, but the role of new imaging technology is increasingly recognized by demographers.

Evidence for sex-selective abortions is scattered. One piece is the increasing availability of ultrasound technology by the early 1980s (Gu 1994; Zeng et al. 1993). Ultrasound B technology (capable of sex detection) was introduced on large scale beginning in 1982, and by the early 1990s, nearly every county was equipped with these machines; statistics indicate that there are an average of four machines per county. Some of the machines at township-level family planning service stations are not of high enough quality to detect the sex of a fetus, but those at hospitals and family planning service stations above the township level can. Many people have access to these machines, and although the government makes attempts to regulate their use and prohibit sex-detection, many are privately owned and the rules and control of the state are fairly easily avoided.

Of course, data on sex of aborted fetuses would help in our estimation of the contribution of abortion to SRBs, but sex is not recorded for most induced abortions. Although we do not have such data for the country as a whole, we can get some hints from several smaller studies that collected abortion data. A study of hospital births in 29 provinces found rising sex ratios at birth through the late 1980s and early 1990s (reported in Zeng et al. 1994). SRBs for 1988 to 1991 were: 108.0, 108.3, 109.1, and 109.7 respectively. In these hospital settings, we can expect that there was no underreporting and no infanticide, so the high sex ratios had to be because of sex-selective abortion.

In another study (reported in Gu and Roy 1995), data on over 10,000 abortions were collected from southern Zhejiang in 1993. The province as a whole had a SRB of 116.7 in the 1990 census; the particular area where the study was done had an even higher ratio of 120. Table 5.5 suggests the role that sex-selective abortions might be playing in the high sex ratios at birth. The sex ratio of the

any, re-emergence of girls into the cohorts born in that half decade [1985-1990], implies that they were never born, were killed at birth, or are being concealed by their parents with a tenacity which is hard to imagine. Thus the hypothesis of under-reporting appears much weaker in regard to the 1990 census than it had appeared in analysis of the 1987 or 1988 Survey results" (p. 13). It appears that although under-reporting may account for some of the missing girls, it is not the major cause of the continuing and rising SRBs.

An earlier paper by Johansson and Nygren (1991) suggests that adoption out of female infants might account for up to half of the missing girls early in the 1980s. Using data on adoption reported by adopting mothers in the 1988 2/1000 Survey, they find that the sex ratio among adoptions is very low, and has actually declined in recent years (as the numbers of adoptions has increased). When they added adoptions to births, sex ratios move closer to normal, and the numbers of missing girls was reduced by about half. Hull and Wen (1992) again argue that these girls who are not reported as adopted should reappear in later surveys and censuses, but that only insubstantial proportions do so. Coale and Banister (1994) also find that adoption does not hold up as an explanation; adopted-in girls would be enumerated, especially since their (adopting) family would be getting resources and services for them and would thus have no reason not to report the adoption. But in China, as in other societies, adopted children are under-reported, and they are more likely than biological children to be missed in fertility or census counts; further, their numbers have been reported by a number of sources (see also Johnson 1996) to be on the rise. That suggests that adoption does play a role in the missing girls phenomenon, but what proportion of the missing girls is accounted for by recent adoption practices is not certain.

There have been reports of infanticide across China for centuries. Coale and Banister (1994) use data from the last four Chinese censuses and find evidence of female infanticide since early in the century. In recent decades, the Chinese press has reported on current cases of female infanticide, but since the purpose of these reports is as much to present negative examples as to report current events, it is not clear how widespread such practices are. Zeng et al. (1994) argue that infanticide could not be widely practiced if only because of the difficulties of committing such a crime in a society like China where neighbors and officials are aware of most daily activities. Further, they say, the psychological and moral costs would also make this practice difficult for many parents. But others have pointed to the influence of cultural norms such as those that recognize births only after a month of survival (Coale and Banister 1994; see also Greenhalgh and Li 1995), which could relieve parents of some of the psychological trauma of infanticide.

A related issue is selective neglect of female infants and girl children, which might result in the death of these children. As we reported above in the discussion on mortality, excess female mortality and higher-than-normal sex ratios at most ages suggests that differential treatment of girls is practiced fairly widely in China. Undoubtedly, such practices lead to the deaths of female infants. Although,

(1994) has argued that female infants were more likely than males to be missed in mortality counts (and see Tu and Liang 1994); because the births of these infants were also likely to have been missed, adjusting mortality figures would probably require adjusting fertility statistics as well, and would therefore affect (upwards) the SRB. In a recent estimation (see Table 5.4)], Banister estimates that the number of girls under age 14 missing from the 1990 census was between 4 and 6 million. Even if the specific numbers are disputed, these numbers represent the seriousness of the issue.

Most of recent discussion in the literature centers on explanations for the high sex ratios. Four possible explanations have been offered: female infanticide (and/or death through or after abandonment or neglect); underreporting of female births; adoption out of female children; and sex-selective abortions. Statistics on these different practices are not available. The sex of aborted fetuses is not usually collected, and even more rarely reported. In a society where female infanticide is strongly discouraged by the state, any such action is likely to be underreported. Even statistics on formal adoption are not easy to come by, and many adoptions are done through informal channels. Any underreporting of births that does occur is done to avoid official notice of a birth (usually so that a couple can try again for a boy) so these births would obviously be difficult to detect. Thus, there is no definitive answer to the questions many have raised about what happened to these girls; all that demographers can do is to attempt to read and interpret the clues. For demographers, these are often statistical clues; for others, there are hints that are revealed in daily social life or that are shadowed in published reports. All of these depend on a great deal of interpretation, which is the source of many of the disagreements. There have been several recent investigations into the causes of the missing girls by Chinese demographers (see Gu 1994) and these have been useful in understanding the underlying causes, but again, we do not have definitive answers.

Zeng et al. 1993 argue that the practice of underreporting of female births accounts for between 43 and 75 percent of the difference between the reported SRB during the second half of the 1980s and a normal SRB value. Using 1990 census data, they apply reverse survival methods and estimate that the undercount of male births is 2.26 percent compared to 5.94 percent for female births. Using those figures, they estimate corrected sex ratios at birth for 1989 and the first half of 1990 to be 111.4, lower by 4.0 male births per 100 female births than reported sex ratio of 115.4. From these calculations, they argue that the sex differential in underreporting of births accounts for at least 51 percent of the difference between a normally expected value of 106 and the ratio reported in the census.

However, other demographers do not agree with these conclusions. Hull and Wen (1992) have argued that if undercounting played that kind of part in the missing girls, we should expect to see those missing girls showing up in later population counts, when they are of an age to seek services such as education or health care. Hull and Wen conclude, however, that "the fact that there was little, if

consider the effects of the program in light of early arguments for birth planning by the Chinese government: it would benefit women particularly because it would free them from the physical dangers and general energy depletion of many births and less-than-safe remedies to prevent or end unwanted pregnancies. It would be difficult to assess the relative effects of child-bearing versus birth planning campaigns and resistances, but in neither situation are women free of physical or emotional/psychological trauma.

Others have reported on abuses suffered by women which are at least indirectly related to the birth planning policy. Wasserstrom (1984) relates reports in the Chinese press of women being beaten by husbands or other family members because they did not produce the desired sons (see also Tien 1985 and reports from the Chinese press cited therein; Honig and Hershatter 1988, pp 232-4; Croll 1995, p. 111ff).

In the last two decades, the lives of young girls have also been in increasing jeopardy, a situation that many have attributed to the birth planning policies. This subject has received enormous attention, both inside and outside of China's borders (Arnold and Liu 1986; Johansson and Nygren 1991; Hull 1990; Hull and Wen 1992; Coale 1984; Coale and Banister 1994; Zeng et al. 1993; Banister 1996; Gu and Xu 1994; Gu and Roy 1995). At the heart of the issue are the "missing girls". Since the early 1980s, examination of the sex ratio at birth (SRB (males per 100 females)) has revealed that millions of girls are "missing" from China's population registers, and, perhaps even more troubling, the situation seems to have gotten progressively worse throughout the 1980s. Table 5.3 presents the historical change in these sex ratios and the much higher ratios for higher order births. Whereas the ratio is close to normal for first order births throughout the 1980s, each increase in birth order coincides with increasingly higher ratios.

Although there was some discussion early in the decade about whether or not these ratios were "real," by the early 1990s, most demographers had accepted the overwhelming evidence that millions of girls are indeed missing. At the 1992 census conference in Beijing (the International Seminar on China's 1990 Population Census), Chinese and foreign demographers discussed findings from the recently released census data. Several Chinese demographers wrote at that time "That the reported SRB in China increased considerably during the 1980s, reaching a level that is significantly higher than the normally expected value by the decade's end, is a statistical fact that should be taken seriously by scholars, the government, and the general public" (Zeng et al. 1993, p. 285). And in November 1994, the United Nations Population Fund (UNFPA) sponsored the "International Symposium on Issues Related to Sex Preference for Children in the Rapidly Changing Demographic Dynamics in Asia" in Seoul, where discussions of the situation in China were broadened even further. The fact of increasingly higher sex ratios at birth is no longer in dispute.

However, there is still considerable disagreement about issues related to the missing girls. There is some question about the numbers; for example, Banister

It is to the degree that people in China have absorbed and agree with this perspective that they support the birth planning policies. To many, the notion of population means more than just how many children one has, but represents important notions about China as a nation.

### Reshaping the Policy

Other evaluators have tried to understand how the state reshaped the policies as the early system of implementation and targets were re-evaluated. White (1994), Greenhalgh (1990) and Greenhalgh et al. (1994) write in this vein. Greenhalgh (1990) argues that the birth planning programs should not be seen as based on a "cycles of coercion" model as some western demographers have done. She argues that such an approach overlooks the ways that the policies have changed in a way that seems to reflect "a process of learning by [Chinese] policy-makers" (p. 194). She employs knowledge gleaned from other areas of the Chinese political arena to argue that Chinese birth planning policies began as an "order goal" in which "the aim is to prevent people from doing what policy-makers consider the wrong thing (in this case, having several children)" p. 195. But Greenhalgh argues that since those early days of the one-child policy, the policy has changed considerably, and is now best seen as an "economic" goal, "best achieved through the application of economic and normative measures to alter the environment in which childbearing decisions are made" p. 196. The change occurred for a variety of reasons, including the impact of economic reform on methods of implementation (see also White 1994), peasant resistance to birth planning goals and methods, and new demographic knowledge available through data collection and new techniques of analysis. More than do many western-based evaluations of the Chinese policies, such a perspective gives weight to the ways that the Chinese leadership has modified their goals and methods to take into account new understanding and knowledge as well as criticisms, suggestions, and political interests.

### Effects on Girls and Women

However, even from within the Chinese context, scholars and policy makers have raised criticisms of the policy goals and methods of implementation. One of the strongest criticisms is that some groups are affected differently than others under and by recent and current birth planning policies. Central to this perspective is the ways that girls and adult women are affected by the policies of the past 15 years. Before taking up the issue of the "missing girls", let's look at the ways that adult women have been affected by these policies.

The most explicit examination of the effects of the birth planning policies on women is Greenhalgh (1994; see also Wasserstrom 1984; Croll et al. 1985). Women have had to bear more of the immediate consequences of the program (and peasant resistance) than have men, because the program has focused on female contraceptive methods, and because it is women's bodies that are subjected to IUD insertions and removals, abortions, or sterilizations. It is interesting to

Potter and Potter (1990) as part of their extensive ethnographic account of a village in South China. They describe the tensions and disagreements over the birth planning policies in the village, but incorporate the particularly Chinese context. Villagers believe that both they and the state have legitimate interests in the area of birth planning, and it is here that the disagreements arise. Villagers see having children, and in particular sons, as vital to the meaning of family. There is both an economic and moral imperative to have children. Children will care for elders in their old age, but that care and the relationship between parents and children reinforces the very central belief of "dependent security" which is at the heart of Chinese families; in this context, not to have a son is considered a moral failure. Thus to have children (and sons) is an expression of cultural beliefs, a way of meeting cultural expectations.

The state, however, wants these villagers to curtail their fertility, even as far as not having a son. Villagers resist the state in this matter, but not because they believe the state is invading their privacy or trying to dictate private behavior. In a society where it is considered proper for the state to be involved in "private" social life and where the individual interests of a husband and wife are not defined as socially significant, this kind of intervention is seen as legitimate. "The concept of privacy, which validates these interests in the west, does not exist to be invoked" (p. 235). Even the state's interest and goal in limiting population growth is understood and accepted by most villagers since, in their view, the state has the mandate and responsibility to do what is needed to ensure that the needs of all citizens are provided for. At the heart of the disagreement and conflict over the birth planning is the fact that although both state and family have an appropriate interest in births, the needs and goals of the state and the society are in conflict with the cultural beliefs and shorter term goals of the peasants. When these conflicts are resolved, "then what it means to have a child in China, and to be a child in China, will change, yielding dramatic new cultural and social forms" (Potter and Potter 1990, p. 250).

A very interesting and somewhat unique perspective on China's population policies is that of Anagnost (1995) who attempts to "account for the hegemonic power of China's population policy" (p. 39). In her view, the policy is supported as well as it is by most people in China because balancing resources and population is seen as necessary to achieving national success. Controlling population-- through control of reproduction--is a sign of China's modernity, a mechanism through which China can demonstrate the superiority of socialism.

"The policy does not address primarily fears of a demographic crisis (the threat of famine) but fears of a cultural and political crisis. It is explicitly conceived as a strategy to speed the pace of development so that China might attain its rightful place in the world before the rate of population growth renders such a transition impossible. China's population policy is a test of national will, a race against time and history" (p. 27).

use in China is not voluntary but coerced, and that couples can be pressured at several points in their reproductive careers to delay marriage, use contraception, undergo abortion, and/or undergo sterilization. Banister (1987, p. 217-8) argues that China violates the internationally accepted standard "that all use of birth control should be voluntary."

These and similar arguments (see also Hardee-Cleaveland and Banister 1988) are difficult to assess. There is no doubt that there have been instances and even periods of coercion within the birth planning program. Excesses in implementation have been discussed in the Chinese as well as the western press. But it is also true that family planning in China is quite different from that in any western society, for a number of reasons, and those differences somehow have to be taken into account; the issues and questions that lie at the center of debates about reproduction in the west are not necessarily the same ones that are central in China. And this difference makes this kind of program evaluation very thorny. How do we bring what some see as universal standards of evaluation to the particular Chinese context?

### The Role of Central Planning

First, we must recognize the differences between western notions of family planning and the Chinese idea of birth planning. Programs in many countries are accurately labelled "family planning" programs to denote emphasis on the dissemination of information and technology that allows couples or individuals to plan their families. China's program is more accurately named a "birth planning" or "population planning" program because those terms signify a different emphasis in China, one which is based on the belief that human procreation and material production (the "two kinds of production" often referred to in Chinese discussions of birth planning) must be kept in balance in a socialist society. Birth planning is thus not an individual but a societal effort. By the late 1970s, Chinese leaders saw population control as a central part of economic growth planning; population policies were developed based on the belief that "population policy must conform to the needs of political and economic reform, not vice versa" (White 1994, p. 139).

The place of birth planning within Chinese state goals and planning (rather than being an individual or family matter) is underscored when seen as one of many campaigns that use methods unique to China. White (1990) discusses the ways that birth planning in China is in many ways a new kind of mass mobilization campaign. It was similar to mass mobilization campaigns of the Maoist era which were "organized mobilization of collective action aimed at transforming thought patterns, class/power relationships and/or economic institutions and productivity" (Cell, cited in White 1990, p. 57). The birth campaign was more regularized and institutionalized than those earlier ones, having as its goal not necessarily attitudinal or cultural change but practical results. Still, its roots are clearly to be found in the earlier methods of social and economic change.

A very insightful evaluation of China's birth planning program comes from

underlying preference, a considerable number of families with two daughters or two sons could be expected to continue bearing children, if the family planning program did not inhibit them from doing so" (p. 478).

Whyte and Gu also find that fertility desires are associated less with actual income levels (there is a curvilinear relationship between fertility preferences and income levels, with the richest and poorest couples wanting the most children) than with educational aspirations that parents have for their children; those who want their children to receive high levels of education seem to recognize the associated costs, and want fewer children. Whyte and Gu argue that this suggests that China is creating unrealistically high aspirations; it is not likely that high numbers of rural children will be able to go to college in the near future, and so current aspirations are not likely to be met. But the success of the family planning program has been built to some extent on this principle, that fewer, "better quality" children will ensure family success. What will happen, these researchers ask, when these aspirations are not met and large numbers of the rural population meet inevitable frustrations? Their research raises questions about social stability and peasant satisfaction in the future.

### *Weighing Program Benefits and Costs*

In this process of program evaluation, we can take a step back even further, and look at other consequences of the program: have the fertility successes achieved been worth the costs of the program? For, while there are obvious successes in China's program, there have been some heavy costs as well. Attention to this question has come from a variety of perspectives. We first examine some particularly western critiques of the program and then look at other discussions which make efforts to evaluate the birth planning program within the Chinese context.

#### Western Criticism

Much of western criticism of the Chinese program is focused on the apparent disregard for human rights in the area of family planning in China. Here we present arguments made within the demography community, and do not take up the extensive criticisms made in the popular press. (Although some of the latter are fairly sensationalist, many of the themes of criticism are reflected in the academic literature as well.)

Few demographers have argued that population growth in China did not need slowing, or that fertility control would not have to be a necessary component of population change. But several prominent western demographers have been critical of the methods used to bring fertility down in China. John Aird and Judith Banister have both written about what they see as excesses in the birth planning program (Aird 1986; Banister 1987, p. 192ff). Both have argued that contraceptive

### Changes in Fertility Preference

Examining changes in fertility and family size preferences also helps to understand the reasons for the recent fertility declines. A fertility decline which occurs in the absence of changes in fertility preferences suggests that it is the program that is inducing decline. (Of course, this kind of assessment assumes that the means of fertility control are widely available, as they have been for over twenty years in China).

In China, measures of fertility preference might tell us something about what might happen to fertility levels if the birth planning program were not in place, or if it were not implemented so strictly. For example, in his analysis of Sichuan fertility change, Wang (1988) argues that the rise in fertility that occurred when the program became more lenient suggests that people really wanted more children than they were permitted to have, and that it was government strictures that kept fertility down. A similar suggestion comes from Li's (1995) findings of fertility differentials in Hebei. She found that those with urban hukou (household registration), who live under stricter government control, have fewer children than those without urban hukous, even though they may live in urban areas. Further, although fertility levels are differentiated by socio-economic factors for those with peasant hukous, there is no similar differentiation among those with urban hukous. Although it may be that fertility desires differ among the two groups, her findings do point to the strength of the program in keeping actual fertility low among those with urban hukous.

Several studies have indicated that fertility preferences have indeed declined in recent years (Greenhalgh and Li 1994; Whyte and Gu 1987). Hermalin and Lu (1990) use the 1984 In-depth Fertility Surveys (IDFS Phase I) and a smaller survey of fertility preferences conducted in Shanghai to evaluate preference data quality. They calculate an estimate of fertility preference of 2.29 children (rather than the 1.8 children officially reported from the IDFS). In one area of Shaanxi (Greenhalgh and Li 1995), 86 percent of peasants said that the two child family was ideal; that one of these has to be a boy suggests continuing interest in sons, but these results also show a desire for a daughter.

Whyte and Gu (1987) have looked not at program results per se but at the evidence for government success in changing fertility desires; a focus beyond simple fertility preferences to the more complex motivations underlying these preferences makes their article especially interesting. Using a variety of data sources (some, as they themselves admit, with questionable accuracy), they find that in none of the provinces they look at do a majority of couples want three or more children; that finding suggests government success in reducing fertility desires. But they also find that in no province did a majority say they wanted just one child either; most wanted two children. However, even that level of success is questionable, according to these researchers who argue that "it would be misleading... to conclude that the modal family size preference, as revealed in Chinese survey data, is two children. Instead, the most common situation seems to be a desire to have at least one son and at least one daughter. Given this sort of

conclusions are similar to those who found an early relationship between certain individual-level characteristics, such as education and occupation (see discussion above), which have nearly disappeared since the program got stronger. "Demonstrating preprogram beginnings of fertility control among educational and urban elites does not minimize the awesome strength of the later family planning programs in urban and rural areas, once begun" (Lavelly and Freedman 1990, p. 365). (In fact, in other research, Lavelly finds that historical, societal-level events are the dominant influence on local fertility rates (Lavelly 1984).) But it does suggest that, just as others have found in other societies, there was a synergism between the social and economic changes occurring in many parts of China and the developing birth planning policies (see also Liu and Li 1993).

Since the family planning program got underway, how much of the fertility decline can be attributed to it? Here again, researchers have pointed to the evidence that social and economic factors have played a role. Tien (1984) found that provincial-level fertility rates in the early 1980s were negatively correlated with level of urbanization, total output per person (a measure of standard of living) and higher life expectancies. He argues that in addition to any effects of these social and economic factors on fertility levels themselves, another influence is routed through the family planning program; in better off provinces, the government is better able to pay the costs (through incentives and resource provisions) of getting couples to reduce fertility.

One of the more comprehensive analyses in this regard is that undertaken by Poston and Gu (1987). Using provincial data from the 1982 census as well as other data related to programmatic results and social and economic characteristics available from official government sources, these researchers attempt to disentangle provincial-level program effects and socio-economic influences. As have others, they find that both program and socio-economic change play a role. There was a high degree of association between some indices of development and family planning behavior, lending support to arguments that birth planning programs reinforce and socio-economic change. Their findings indicate that fertility levels (TFRs) were strongly influenced by contraceptive use. They also find that, of the indices measuring socio-economic development, their index of women's status had the strongest indirect effects on fertility (through family planning behavior).

Poston and Gu conclude that the effects of the birth planning program have been aided by changes in socio-economic development and that both help to explain regional fertility differentials. But parsing the separate effects of the birth planning program on the one hand and socio-economic changes on the other has been less successful than have efforts to separate the demographic components of fertility decline such as the effects of marital fertility and age at marriage. Clearly the former is a less exact science in any society, and, in China, at least, not all pieces of the data puzzle are always available for such an exercise.

China also reveal great differences which serve to highlight China's unusual experience. Mortality decline began in India in the 1920s and continued steadily downward until the 1980s. China began its mortality decline in the early 1950s, but it was much more rapid than India's, achieving low levels by 1970. Currently, India has higher mortality rates, especially among infants and children.

Fertility patterns have also been quite different in the two countries (Table 5.2). In 1990, India's TFR was nearly twice China's. Decline in marital fertility has played a significant role in the declines in both India and China, accounting for around 75 percent of the fertility decline in both societies (Kukarni and Rani 1995). But although the relative share of the decline was about the same in both places, China's absolute marital fertility change was much greater than India's, and suggests just how pervasive family limitation was in China.

Explanations for the fertility and mortality differences between the two countries have ranged widely. Scholars have pointed to the role of education in mortality decline (China has achieved higher literacy rates and school enrollment rates than has India, especially among females). Certainly one factor in China's remarkable mortality decline and current low rates was its wide network of health care. Intensive immunization programs and government supported child care have been part of that health transition (Roy 1993).

That same kind of widespread--and very effective--network has also been at the heart of the fertility decline. That the gap between India and China's fertility levels opened up considerably after 1971 is probably not a coincidence, since that year marked the beginning of intense effort to control population in China and the use of extensive resources at all levels and in nearly all localities in implementing government policy. India, which began with a relatively strong program, does not currently have as strong a program nor the same means to implement it. In fact, it is this comparison with India which makes it clear that socio-economic (and political) change as well as a very strong family planning program have both been part of demographic change in China.

### Evaluating program effects

Lavely and Freedman (1990), using data from the 1982 1/1000 Fertility Survey, examine the timing of the onset of fertility decline to reflect on the role of government effort in later decline. Although government policies were obviously instrumental, these researchers argue that a fertility decline was well underway by the time of the first family planning programs in 1963 (urban) and 1971 (rural). The beginnings of fertility decline were especially evident among the more highly educated strata; that was especially true in urban areas, but there was also evidence among better-educated women in rural areas. They argue, "The early spread of fertility control in China, although not substantively important as a demographic phenomenon for the total population, nonetheless demonstrates that education and urbanization were producing the conditions for an incipient transition even in the absence of direct government intervention" (p. 357). Their findings and

trends suggest great success. However, the second column of that table, the proportion of births which were second-order, reflects the difficulty that China has had in reducing fertility and growth rates to the levels originally set: nearly a third of births in 1987 were still second order births. Parity progression ratios (see discussion above) indicate that after the late 1980s, there were further declines in higher order births, especially in third and higher order births (Feeney and Yuan 1994). Nevertheless, in rural China, over 90 percent of women of parity one were having second births in the late 1980s, and about half of them went on to have at least three children (Gu and Yang 1991).

Thus, evaluating China's birth planning program by its own goals reveals mixed results. By nearly any standards, China has been able to reduce fertility and population growth to an extent many did not believe possible. In fact, many of the efforts to evaluate the published statistics on population change come not only from a need to evaluate data quality or from doubt about the validity about China's official statistics. Given the consistency of data quality in the last 15 years, these evaluations have to be at least partly influenced by a kind of disbelief that such phenomenal change is even possible.

On the other hand, China's population goals have not been completely met, and the difference between the goals and the current situation reflects both the unrealistic nature of some of the goals and the limitations of even a very strong government program to reduce fertility in a short period of time.

### *The Role of the Program*

Even in a society with a strong government birth control program, the social and economic changes also taking place will have an influence on fertility. The next step in evaluating the birth planning programs of China is to evaluate whether—or to what extent—the government program is responsible for the fertility changes that have taken place. This kind of evaluation, of course, is much more difficult. Several strands of research on China's population aid us in this regard.

#### Comparing China and India

Several demographers have compared the population experiences of China and India in recent decades (Jiang 1993; Kukarni and Rani 1995; Roy 1993). There are some obvious similarities between these two large, fairly poor, mostly agricultural Asian countries, which help to illuminate the relative roles that socio-economic change and family planning program have had in population change in China. In terms of their demographic transition, both countries can be considered "late initiators;" both had had TFRs above 5 in the early 1950s, had a decline of more than 1.5 children on average between that time period and the late 1980s, and had a TFR below 5 in the late 1980s (Roy 1993). Both have had government-supported family planning programs for some decades. But the experiences of India and

## 5. EVALUATING THE BIRTH PLANNING PROGRAM

Has the Chinese family planning program been a success? There are a variety of ways to evaluate it. These include: 1) were initial goals achieved (ignoring why and how)?; 2) did the program affect fertility (ignoring goals)? and 3) costs and benefits.

### ***Meeting the State's Goals***

One way to evaluate family planning program success, especially one whose goals were set out so firmly and clearly by the government, is to look at whether or not the program has met those goals. The program has had three specific aims: to ensure that the country's overall population size does not exceed a particular level; a reduction in the total fertility rate (TFR) in order to achieve that goal; and elimination of higher order births in order to achieve a lower TFR.

### Population Growth

In 1979, the government declared its overall population goal to be to limit the population to 1.2 billion in the year 2000; in 1984, that goal was altered slightly, but significantly, to "about" 1.2 billion at the end of the century. The population at mid-year 1996 was 1,217,600,000 (PRB 1996), thus exceeding the original goal. Projections of population size for the year 2000 vary, but at the current rate of natural increase of 1.1 percent, we can expect China's population to be 1,272,400,000; the Population Reference Bureau estimates that the 2010 population will be 1,387,000,000 (using an average rate of natural increase of 0.93 percent). Whether or not China decides it has met its population targets depends both on how fast the population grows in the next five years and on how high a figure is included in the "about 1.2 billion" figure.

Most demographers, even within China, recognized the 1.2 billion figure to be an ambitious goal; some believed that it was deliberately set unreasonably high in order to encourage even greater effort to reduce population growth. Perhaps a more useful measure of achievement (and more reflective of the enormous achievements of China's program) have been the fertility declines which we discussed above. Fertility fell dramatically, from a TFR close to 6 in the early 1960s to 2.36 in the early 1980s and to 1.8 in 1996; there is no other society which has achieved this kind of overall fertility reduction in such a short period of time, regardless of goals or means.

Looking at the proportion of higher order births is particularly relevant for China because reducing that proportion was one of the central efforts of the program. Success here has been particularly impressive. As Table 5.1 shows, the proportion of all births third or higher order dropped from well over half in 1973 to a mere 17 percent in 1987. The proportion of births that were first order rose in a similar manner, from one fifth of all births in 1973 to just over half in 1987. These two

guidelines.

After several years of efforts to enforce a strict and universal birth planning policy at the start of the campaign, the central government issued Document 7 in April 1984; its purpose was to make the policy more realistic and fair and easier to enforce for local cadres, but still be able to reach the 1.2 billion goal. The document encouraged officials to adapt policy to local circumstances and to use regular, routine methods of enforcement rather than more heavy-handed methods. Document 7 also announced the government's intention to "open a small hole to close a large one" and allow second children in rural areas, if the ultimate goals could still be met. It was hoped that through this means, there would be less resistance to the overall policy and the policy might succeed even in those areas where peasants continued to have a strong desire for more than one child. In addition, by 1985, the central government quietly changed its population goal, from 1.2 billion to "about" 1.2 billion by the end of the century.

This change at the central level had profound influences on local-level family planning activities. In some areas, at least, local cadres were able to expand the number of exceptions to the one-child rule, eventually allowing a second child to all rural couples whose first child was a girl. In addition, there was less resort to short-term crash campaigns aimed to maintain quotas and more emphasis placed on long-term methods of reducing births, especially those of higher orders (Greenhalgh 1986).

But in other areas, cadres were still under pressure to meet birth quotas and resorted to methods to meet immediate goals that resembled earlier methods. Huang (1989) reports on one such campaign in 1985 in rural Fujian Province. In response to pressure from higher levels to reduce the number of births, a number of village women unwillingly underwent abortions, and others had IUDs implanted in order to ensure village compliance with provincial fertility goals.

By 1989, birth planning efforts were intensified. As we reported above, local efforts were strengthened through changes in incentives and disincentives, through the way that family planning work was organized, and through the resources brought to the program. By 1993 Peng Peiyun (1993), director of the State Family Planning Commission declared that these new efforts and methods had succeeded, and fertility was again under control (see Greenhalgh, et al. 1994 for a description of efforts and results in one location in Shaanxi).

(Kane 1987, p. 77). The third Campaign, begun in 1971 and continuing until the end of the decade, had a far wider impact, both geographically and demographically. Called the Wan, Xi, Shao campaign to underscore its emphasis on later marriage, longer birth intervals and fewer births, it represented a much stronger effort by the government than any earlier efforts. During this campaign, rural health services increased in coverage and scope, making available contraceptive and abortion services throughout most of the country. In addition, it was during this campaign that the concept of "birth planning" influenced fertility behavior: annual targets for births were established at national and provincial levels and--in principle, at least--were the basis for approved births at local levels, although during this era, these targets were not always enforced. At the start of this campaign, couples were discouraged from having three children, and by the end of it, in the late 1970s, they were encouraged to have only one child.

By the end of the 1970s, the government had begun to consider population control not only necessary, but requiring extreme measures. Part of this change came from new understanding of the demographic consequences of large birth cohorts; such cohorts, they realized, would have an echo effect for generations to come, even if fertility were immediately reduced to only replacement level. In addition were the specific concerns of the new Deng regime, especially in light of the power struggle that had occurred after the death of Mao Zedong. When he took power in the late 1970s, Deng "promised economic progress to the Chinese people, staking its legitimacy on its ability to achieve prosperity by century's end. Having seen rampant population growth eat up economic gains in the past, China's leaders were convinced that their economic project would fail if it could not staunch the growth of the population, especially the rural component of it, which made up over three-quarters of the total." (Greenhalgh and Li 1995: 607)

For these and other reasons (see White 1994; Greenhalgh 1990), the government launched the One Child Campaign in 1979. As initially implemented, all couples were to be limited to just one birth, and couples were expected to apply for official approval before conceiving a child. In addition, a system of rewards for compliance and punishments for non-compliance was put into place. These differed by locality, but included preference in education, health care, housing, and job assignments for those who had only one child. Those bearing an out-of-quota child might lose access to education, be fined, or lose other "privileges" granted the rest of the populace. Through these methods, the government set a national goal of limiting the population to 1.2 billion by the year 2000.

Since the start of the One-Child Campaign, birth planning policies have undergone significant change. Three phases stand out, differing in both goals and methods of implementation (Greenhalgh 1990; White 1994). In the early years, the government maintained high goals and implementation methods were particularly harsh. In the mid 1980s, the government changed its methods and the policy became more lenient. At the end of the 1980s, with new figures documenting unacceptably high fertility levels, the central government issued more stringent

#### 4. CHINA'S BIRTH PLANNING PROGRAMS

Much has been written about China's birth planning policies and family planning programs of recent years (for longer, general descriptions of the policies, see Tien 1991; Tien, et al. 1992; Conly and Camp 1992; White 1991; Kane 1987; for details on the later birth planning campaigns, see Chen and Kols, 1982 and Greenhalgh 1986; White 1994 is a particularly interesting discussion of the background of the later birth campaigns). Here we briefly sketch the history and some of the key aspects or results of the programs and policies; we then take up the issue of how the program has been evaluated since its implementation.

In the earliest years of the People's Republic, Chinese leaders believed that China needed a large population for security and development purposes. But with rapidly declining mortality and greater realization of the resources needed to sustain an ever-growing population, China's leaders began to contemplate and to test birth planning policies. Although it was not until the early 1970s that government leaders spoke out openly and consistently about the negative relationship between population growth and economic development, there was growing support for that view beginning in the late 1950s (see Kane 1987, Chapter 2 and White 1994 for interesting discussions of disagreements and evolution of birth planning policies in China).

The first birth planning campaign got underway in 1956 and lasted for about 2 years. It was not very successful, having limited impact on some coastal urban populations. At that time, the government did not have available adequate supplies of high-quality contraceptives, and policy makers did not rely on sophisticated population principles. That campaign ended just as the Great Leap Forward (GLF) began, during which government leaders insisted that labor mobilization and industrial development would be the basis for adequate production and would free the country from the burdens of overpopulation. With the dire failures of the GLF, the Chinese leadership was once more ready to develop other ways to balance population and resources.

The Second Family Planning Campaign began in 1962 and lasted until the disruptions of the Cultural Revolution in 1966. During the campaign, the government encouraged later marriage, smaller family size, and longer intervals between births, and worked to make contraceptives and abortions available. This campaign was focused on urban areas and some urban areas experienced remarkable declines during this period. Rural areas were less equipped for such a campaign, and in general, the campaign had little effect there (but see Lavelly 1984 on how the campaign affected a model commune in Sichuan).

By the end of the 1960s, few in the central government had doubts about the importance of birth planning and population control, believing these to be central to any goals of economic development. China had begun to develop and produce its own contraceptive devices and by 1972 was considered self-sufficient in this area

demographic reach of the Chinese state can be formidable indeed" (p. 389).

Gates (1993) has written about childbearing among urban capital-owning women and demonstrates how some groups have more reason to limit births, even in a society like modern China which has a strong fertility program but where kinship rules often encourage childbearing. Women do not always want the number of children expected by their families, whether because of time constraints or personal preferences. Those women who have capital invested in their household enterprises and are making significant economic contributions to their families are able to "negotiate down the number of children they bear for their husbands' families" (p. 253). In such petty capitalist, or highly commoditized environments, everything--including goods, labor, and obligations--can be bought and sold. Childbearing is women's obligation to their husbands' family, but among this class, it is a measurable obligation, and economic contributions can substitute for the obligation to have a number of children. Gates' close study of this admittedly small group of women is important for its suggestions of the ways that family members, and those with traditionally less power like women, can negotiate reproductive pressures.

China has undergone a remarkable and unprecedented demographic change in the last thirty years. Steep fertility declines have been registered among nearly all groups throughout the country. While social and economic changes have obviously played some role in the fertility decline, their role has been largely overshadowed by the huge impact of the government's birth planning policies. Examining those policies will allow better understanding of China's experience. We take up the birth policies more directly in the next two sections.

rates, women who were not contracepting, and abortions and uses creative approaches to determine sites and strategies of resistance. For example, by examining the timing of IUD expulsions and the resulting pregnancies after such expulsions (four-fifths of women became pregnant within three months of IUD removal), she concludes that the majority of those "expulsions" were actually illegal removals by women trying to circumvent fertility restrictions.

Women also resisted sterilization (often with the complicity of local cadres) until they achieved the informally accepted minimal number of children of two, when they were more likely to be heavily targeted for contraceptive surgery. But, as Greenhalgh explains, "resistance had paradoxical effects for women; while lifting the limit on the number of children they could have, at the same time it put their bodies at risk. For example, the more children a woman succeeded in having, the more likely she was to be labeled a troublemaker and targeted for surgery. The more women contested the implantation of IUDs, the greater the number of insertions, extractions, and reinsertions of the device they had to undergo. Getting pregnant outside the community ideal always entailed the risk of detection and subsequent "mobilized" (i.e. coerced), often late-term, abortion" (p. 23). Women's resistance had an effect both on the number of children they bore and on the general rules that the local officials followed.

But when fertility in rural areas rose in the mid to late 1980s, officials at the central level renewed their commitment to birth planning and to fertility reduction. Research in Shaanxi by Greenhalgh and her colleagues (1994) helps us to understand how it was that "after more than a decade of far-reaching economic and political reform, the political center could translate its new demographic demands into reproductive reality at the grassroots level" (p. 366). They show that fertility fell because of a combination of, on the one hand, social and economic changes that made large numbers of children less desirable to most families and, on the other hand, a strengthening of the birth planning program. Economic changes, especially those resulting from the reforms of the early 1980s, allowed new routes to economic success, including through industry and commerce, and in the process, have made children more expensive. Although most couples in these villages still want two children, very few want more than two.

At the same time, new and greater inputs were put into the birth planning program: more money was available for birth control surgeries, for incentives for program compliance, and to provide higher salaries for birth planning personnel; and closer monitoring of women was achieved through regular mandatory gynecological exams. Birth control campaigns were also regularized and relied less on the unpopular "shock campaigns". The result of these changes was further success in achieving birth targets. Greenhalgh and her colleagues conclude "This microstudy of three ordinary and remote villages provides dramatic testimony to the changes that can be wrought all the way to the bottom of the administrative hierarchy when leaders in Beijing decide that rapid population growth must be brought under control. Even in an era of market reform and political loosening, the

demographic data can actually reveal those shifts. Although fertility did fall as women's education and labor force participation rose, those changes were not timed or sufficiently broad to account for some of the most notable fertility trends. Pre-liberation fertility was low because of social and economic disruptions (e.g. high infant and adult mortality, frequent spousal separation, high morbidity, periodic famine and deliberate attempts to limit fertility). After 1949, and with a reduction in most of these difficulties, fertility rose, peaking in the mid 1950s. Following the Great Leap Forward in the late 1950s, fertility began a steady decline, not because of modernization, but because of the advent of increasingly effective family planning programs. Thus, the fertility (and migration and mortality) patterns of this Tianjin neighborhood highlight important signposts in the area's political, social and economic history and reveal the ways demographic data can be used to uncover such shifts.

Our understanding of population dynamics in China has also been enriched by a series of articles by Greenhalgh which focus on a group of villages in Shaanxi Province (Greenhalgh 1993, 1994a; Greenhalgh and Li 1995; Greenhalgh, et al. 1994). Particularly useful has been the way that she has illuminated the connections between state birth policies, their implementation at the local level, and their effects on individual women. By presenting the social, economic and political context of program implementation, Greenhalgh's research, probably more than any other, gives us a sense of the struggles over the policies at the local level and the results of the struggles. She argues that the one-child policy, as conceived at the central level, was unworkable in rural China, where families needed and desperately wanted more than one child and often three or four children. During the 1970s, cadres in these rural Shaanxi villages were able to enforce many of the rules (such as late marriage, prevention of higher order births, and the use of contraception) through economic, political incentives and disincentives (awarding state jobs to those who comply, fining for those not complying or giving vacation to those who did). But with the introduction of economic reforms in the early 1980s, these cadres lost much of their power to enforce the fertility regulations, and they began to compromise. At this point, "local cadres' strategy, apparently, was to oblige state and society at once" (1993, p. 246). They allowed nearly all couples to have two children, and focused their efforts on preventing third and higher order births, thereby satisfying the peasants' most pressing desires and still achieving the state's goal of eliminating third and higher order births.

Greenhalgh (1994a) has also been able to demonstrate how peasants in rural China resisted the policies and the consequences of that resistance. Particularly interesting has been her focus on the way that gender has been a part of both policies and their resistance. Because the goals of population control and fertility decline have been achieved through increasing the proportion of women using birth control, it is women who have been the main targets of the program, and women's bodies have been the site of both compliance and resistance to the dual focuses of family size and contraceptive practice. Greenhalgh looks at data on IUD expulsion

beginning of this paper, this kind of work has been restricted, both by demographers' ability and interest in spending the requisite time in the field and by Chinese government restrictions on what research can take place within the country. The contributions of the few studies that have been done and the insights they provide into the larger demographic picture argue for continuing efforts to increase this kind of research. In this section, we will take up a few studies that deal specifically with demographic change; in a later section we will discuss other ethnographic fieldwork which has been useful in our understanding of the consequences of demographic change.

One of the earliest of these studies was done by Lavelly in 1981 in Nanquan Commune in Sichuan Province (Lavelly 1984). His research focus was the role of socio-economic development and government policy in precipitating fertility decline. He measures the impact of both social change and policy using a variety of indicators collected in the area. One of the contributions of this study to our understanding of fertility decline in China generally is the way that Lavelly was able to link particular, and often local, demographic change to shifts in policy and to broader social phenomena. For example, although infant mortality and education both underwent marked change in the 1950s and 1960s, he argues that these changes cannot have precipitated Nanquan's fertility decline because the changes paralleled but did not exceed similar changes in other societies, and are not sufficient to explain the rapid decline in fertility that took place.

By closely tracing policy development and implementation, Lavelly presents a convincing argument that the fertility decline was a response to government policy. Historical events marked the shape and timing of fertility decline. In particular, the birth campaign of 1962-6 marked the start of Nanquan's fertility decline. The dip in fertility among women aged 30-34 in 1965-7 (while the fertility of older cohorts remained unchanged) seen in Figure 3.15 is indicative not of macro-level structural changes or new norms, which would affect women at older ages, but of the birth planning campaign, during which those in the middle reproductive ages were the first targeted. The decline in fertility and increase in contraceptive use slowed after that campaign ended and before 1969, when a new campaign (Wan, Xi, Shao) began, and other age groups were included as targets. From then on, fertility declined rapidly. Lavelly uses this study of one community to argue that in Nanquan, as in other areas of China, fertility change has been linked less closely to local social and economic circumstances than to "generalized political events" and to the strong links between central government policy and its implementation at local levels.

In another project, using a standard questionnaire which gathered current and retrospective information, Pasternak (1986) studied a neighborhood of factory workers in Tianjin in 1981. He focused on the linkages between demographic change on the one hand and social and economic change on the other. Like Lavelly, he concluded that demographic change (particularly fertility change) mirrors political and economic shifts in modern China. But Pasternak argues further that

ages. These researchers conclude that the government's program of late marriage has had some effect on birth interval length but most of the change comes indirectly from these social changes through an increase in coital frequency, among both married and unmarried couples.

Wang and Yang are correct in pointing out the broad changes occurring across China that have the potential to influence aspects of marriage and fertility, but just how widespread and deep these changes are remains undocumented. In his work on birth intervals in Hebei and Shaanxi Provinces, Ren (1995b) argues that change to companionate marriage has not been so widespread that birth intervals would be so clearly affected. His analysis also found that those couples who communicate with each other have shorter first birth intervals and he found a decline in the length of both first and second birth intervals; but there were some inconsistencies that prevented a straight-forward interpretation that marriages are undergoing far-reaching change. First-to-second birth intervals were shorter in rural than in urban areas (where, according to Wang and Yang companionate marriages are more likely to be found) and whether or not the marriage was arranged did not have a significant effect on the length of that interval. Perhaps, Ren argues "the essence of courtship in China has changed far less than the radical decline in numbers of arranged marriages would suggest." p. 421 (see also Riley 1994). Developing more refined and fuller measures in this area of interest would be useful in resolving the reasons for these kinds of fertility changes.

*Rural/ Urban Differences:* Rural and urban fertility levels have both undergone extensive changes, of course, but there have been distinct differences. Figure 3.11 shows that fertility declines in urban and rural areas differed in both timing and shape. The 1955 patterns are similar, with urban areas exhibiting lower fertility at younger and older ages, caused by later marriage and some contraceptive use respectively. By 1968, fertility patterns had diverged; urban women were clearly marrying later and using more deliberate means to control fertility. In 1980, rural women had begun to marry later and use contraceptives, but obviously at a lower rate than did urban women.

Feeney and Wang (1993) also look at urban and rural differences in fertility, using PPPR techniques. Their work shows not only the expected result, that the proportion of women of one birth going on to have another is higher in rural areas, but also that the way that PPPRs have declined also differed substantially (see Figures 3.12, 3.13 and 3.14). Although the timing of the declines in all three progressions were similar in all areas, the urban ratios declined more sharply and steadily than did those in town or rural areas. Especially dramatic was the decline in parity progression from first to second birth in urban areas.

### Micro-level Studies

A few studies have focused on small areas or groups of people to attempt to understand China's demographic change in recent years. As we mentioned at the

PPPR analyses have also highlighted some of the underlying demographic dynamics of the mid 1980s. The increase in fertility in 1986-87 was dominated by an increase in the proportion of parity-one women progressing to a second birth. Luther et al. (1990) estimate that that rise accounted for 89 percent of the increase in total fertility, and that increases in the next two parity progression ratios accounted for 9 of the remaining 11 percent increase. Nearly half of all women having a second birth in the late 1980s were going on to have a third birth (Feeney and Wang 1993).

However, progression ratios for the late 1980s and early 1990s (Table 3.10) show that the proportion of women having higher order births began another decline in 1988. Especially sharp were declines in progressions from second to third and from third and higher order to fourth and higher order births. These changes again reflect what we know about the way that the birth planning program tightened up about that time (see below).

*Birth Intervals:* A recent article by Wang and Yang (1996) documents another aspect of fertility change in China, the change in length of the first birth interval. While others have speculated that the decrease in the first birth interval happened as a result of the later age at marriage (making up for late marriage), Wang and Yang argue that it decreased because of broad social changes: transformation in the marriage system away from arranged marriages; expansion of formal education and nonfamilial employment; and changes in premarital behavior that was partly encouraged by the government's family planning program and the information disseminated through and because of it.

Premarital conceptions, although still low, are rising (Table 3.11). They rose from 1.5 percent in the 1950s to 3.0 percent in the late 1970s to 5 percent in the mid 1980s; thus in the mid 1980s, 5 out of 100 pregnancies were conceived before marriage (i.e. births occurred 0-8 months after marriage). First birth intervals shortened considerably in those same years, from a mean length of 34 months in the 1950s to 20 months in the 1970s and to less than 18 months in the early 1980s. Whereas 75 percent of all women in early cohorts had their first birth within three years of marriage, by the mid-1980s, that length was shortened to 1 1/2 years.

In their multivariate analysis of the determinants of first birth interval length, Wang and Yang found women with higher education, those who work in more modern sectors, those who marry late, and those in recent cohorts all have shorter intervals. They attribute this change in interval length to extensive social change which has resulted in increasingly greater intimacy between couples. Because of the decline in arranged marriage and the greater likelihood that women will have been in school or in work in their young adulthood years, couples are now more likely to have met without parental arrangement and to know each other at marriage. With changes in norms about sexuality and more widely disseminated information about sex and contraception, couples are more likely to be sexually intimate before marriage, and to know more about sexual practices at younger

One of the advantages of using PPRs is evident when conventionally calculated TFRs are compared with total fertility calculated using PPRs (TPPPR) (Figure 3.9). (For a longer discussion of the advantages of period parity progression rates, see Feeney and Yu 1987.) Although there are many similarities between the two rates, there are important differences as well. The rate of decline is higher using the conventional rate (0.40 children per year as compared to the 0.25 estimated using TPPPR) because it includes the effects of rising age at marriage, while the other measure does not. But the two rates also represent the fertility experience of the 1980s differently; conventional rates suggest a levelling off of the fertility decline around 1978 but the TPPPR indicates that fertility continued to decline until 1984.

One of the most useful uses of PPRs is to understand the changes in marital fertility in recent years. Particularly interesting in the case of China, where the government is attempting to control second and higher order births, are changes in these higher order births, and in particular, in the proportion of women progressing from first to second birth. Table 3.9 and Figure 3.10 present these ratios for 1967 through 1987. What do these ratios tell us? From Column 1 (B->1), the "progression" from birth to first marriage, we can see that marriage continues to be nearly universal, as most women "progress" to marriage. The second column (M->1) tells us that most married women (and therefore most women) have a first birth, and that that proportion has changed very little in recent years.

Examining the third column (1->2), the proportion of women of parity one who go on to have a second birth, reflects the effects of many influences on fertility in China, but especially recent birth planning campaigns. While total fertility (conventionally calculated) increased in 1981 and 1982, most of the PPR estimates show less change, and total fertility calculated through this measure remained relatively constant. Although progression ratios increased in the higher parity groups, in the most heavily targeted group (and the one likely to produce the most births), those who had had one child, fertility continued to decrease. In fact, nearly all of the fertility decline is attributable to a decline in birth orders of two and above.

In 1979, 95 percent of all women with one child were progressing to a second birth, but by 1984, after the policy had been in effect for only five years, progression to second birth had been reduced to 63 percent. Progression from second to third birth declined by more than half between 1974 and 1985 (from 88 to 42 percent), and progression from third and higher order births to fourth and higher order births declined from 67 to 31 percent over the same period (Feeney 1994).

The fluctuations in the progression from first to second birth reflect the process of implementation of the one-child policy. The sharp decline in progression to the second birth in 1980 occurred as the program got underway; as the program became more effective, this proportion declined more rapidly. After reaching a low in 1984, it actually began to rise as the birth planning policies relaxed in many areas of the country (Luther et al. 1990).

1980s, Chinese population policies were often based on crude birth rates, and as many demographers have pointed out --in China and elsewhere-- CBRs mask some of the most important changes and continuities in fertility behavior. An examination of age-specific fertility rates and age-specific marital fertility rates (Feeney et al. 1989) shows that both declined substantially between 1981-7, and especially rapidly between 1982 and 1984, even where CBRs rose. "China during the 1980s provides an unusually clear example of the confounding effects of age distribution and marriage patterns on crude birth rates, illustrating the extent to which trends in crude rates can distort interpretation of underlying fertility behavior" (Feeney et al. 1989, p. 304).

Further investigations support those assertions, and strongly support arguments that the measure used will make a difference in the assessment of fertility change. Coale et al. (1991) use total fertility rates (TAFR) and total marital duration specific fertility rates (TDFR) for second and third order births to show the effects of age distribution and marriage on fertility. Even as the former levelled off during the mid 1980s, the continuing decline of the TDFRs indicates that until 1986, second order births actually continued to decline. The difference between these two measures reflects the effects of the decline in marriage age in earlier years; because of the marriage boom that began in 1980, there was an inflated number of married women at durations at which second births occur, causing the denominators of duration-specific rates to increase but not the denominators of age-specific rates. Thus, while it is true that there were many more births occurring in the mid 1980s than in 1980, "the continuation of a total duration-specific rate of bearing a second child lower or at least no higher than in 1980 shows that the effect of the one-child policy was not in fact greatly weakened" (p. 392).

In a series of articles (Feeney 1994; Feeney and Wang, 1993; Feeney and Yu 1987; Feeney and Yuan 1994; Luther, Feeney and Zhang 1990), Feeney and his collaborators have argued for the use of period parity progression ratios (PPPRs) to examine fertility changes, because PPPRs (and total fertility measures calculated from them) are less sensitive to changes in marriage than are other more conventional rates (especially total fertility rates), thereby allowing a closer examination of changes within marital fertility. "In the calculation of probabilities of progression from marriage to first birth, for example, numbers of women marrying each year and the corresponding numbers of married women remaining in parity zero appear in the denominator of each birth probability, whence an increase in numbers of marriages from one year to the next does not imply any increase in the proportion of women progressing to first birth" (Feeney 1994, p. 127). Although the data needed to calculate these ratios are not always available (although they can be reconstructed using an extension of the own children method [see Luther et al. 1990 and Luther and Cho 1988]), data from China's several recent fertility surveys do allow for the necessary calculations, and the analyses by Feeney and his collaborators have made significant contributions to our understanding of the Chinese fertility decline in the last two decades.

planning program that was at root of the fertility increase; a rise in second births was an important part of it, but increases in higher order births also played a role.

Cheng (1993) contributes important insights in his analysis of the components of fertility change over the course of three decades (1953 to 1981). Using Coale's measures of  $I_f$  (index of overall fertility),  $I_g$  (index of marital fertility) and  $I_m$  (index of proportion married), he estimated the relative impact on fertility of changes in marital fertility ( $I_g$ ) and proportion married ( $I_m$ ) (see Table 3.8).  $I_f$  fell 56 percent between 1953 and 1981; during those years  $I_m$  declined by 22 percent and  $I_g$  by over 43 percent. The decline in marital fertility contributed more to the decline in fertility than did changes in marriage behavior, although later in the transition, changes in marriage had a larger role than they had earlier in the transition. The large decline in  $I_g$  was due to increases in family limitation, especially at older ages but the rise in age at marriage played a role as well.

Population structure and age at marriage have played key and sometimes dominant roles in recent fertility declines. But as these studies demonstrate, changes in the level of marital fertility have been dramatic and extensive, contributing heavily to the overall decline in China's fertility. The shape of this change in marital fertility has been the focus of other studies. Because much of the focus of birth planning policies has been on reducing higher order births, this attention is particularly well placed in the study of China's demographic changes. Examination of changes within marital fertility reveal something about the effectiveness of the government's birth planning programs.

*Marital Fertility Patterns:* Age patterns of marital fertility in China have undergone extensive changes in the last several decades. To estimate deliberate control of fertility through contraception and abortion, Coale (1984) used data from the 1982 1/1000 Fertility Survey and compared marital fertility with a "natural" fertility pattern for several cohorts (Figure 3.8). The later the cohort, the greater the deviation of marital fertility from a natural fertility pattern. For early cohorts, the ratio of marital fertility to natural fertility was generally above 0.9. However, by 1975, there was a steep decline in marital fertility relative to natural fertility, with evidence of deliberate fertility control among older women. (The reduction of fertility in 1961 was likely not caused by efforts to control fertility but was rather the result of the fertility-suppressing effects of the famine caused by the Great Leap Forward. Further evidence comes from the pattern of marital fertility for 1963; with very high levels of fertility at nearly all ages, it is evident that much of it was "catch-up" fertility in the aftermath of the very low levels in previous years.) By 1980, this controlled fertility pattern is even more evident, and resembles marital fertility patterns found in industrial societies with high use of contraception and fertility levels below replacement.

A rise in fertility in 1981 and 1982, as measured by the crude birth rate, and then again in 1986 and 1987 drew great attention. Did the rise reflect a relaxation of the birth planning policy? Or were there other explanations for it? In the early

downward manner. In China, the TAFR was less than the TDFR from 1950 to 1982 because "the upward movement of age at marriage reduced the annual number of marriages even as entry into marriage remained virtually universal" (p. 391). Multiplying the ratio TAFR/ TDFR for each year by the annual number of births allows estimation of the contribution of changes in age at marriage to fertility decline: the decline in age at marriage accounted for an 8 percent reduction in the number of births between 1950 and 1970 and for a 19 percent reduction between 1971 and 1980, or about 100 million births for the entire period.

Zeng et al.'s analysis (1991), which focuses on the same time period as that of Coale et al. 1991, goes further in its attempt to quantify the different components contributing to the rise in fertility in the early 1980s. Using a triple standardization method applied to data from 1982 census, the 1987 1/100 survey and the 1988 2/1000 survey, these demographers decompose the increase in crude birth rates after 1984 into three components: marital fertility, age at marriage, and age structure. Between 1981 and 1987, the crude birth rate increased 20 percent. Their decomposition analysis clearly demonstrates the different effects of the three components (Figure 3.7). Changes in age structure increased the CBR by 1.59 births per 1000; changes in marriage age had an even greater effect, causing an increase in the CBR by 2.59 births; and a decline in marital fertility reduced the CBR by 3.01 births during the period. Comparing changes between 1981 and 1987 with those in the several years between 1984 and 1987, they found that age structure was more important in inhibiting an increase in the birth rate in the latter period, and that during those later years, marital fertility actually pushed upwards on the CBR. However, this latter change accounted for 20 percent of the increase in CBR, still less than the other two factors; 30 percent of the change was attributable to changes in age at marriage and 50 percent to changes in age structure.

Wang (1988) also uses a decomposition method to help explain Sichuan's fertility experience in the 1980s. Sichuan is China's most populous province and in the past has had quite high fertility. But the speed of the decline in the crude birth rate between 1963 and 1981 was faster than that of any other province. In 1984, the CBR was 10.8, below the rates of most developed countries. But in 1985, the CBR rose unexpectedly by 4.6 births per 1000 and then in 1986 by another 5.1/1000. Understanding Sichuan's experience is useful because while population trends in Sichuan are similar to those of the rest of the country, they are also more pronounced. As Table 3.6 indicates, the decline before 1984 in Sichuan was more rapid than in the rest of country, and the increase in the years after that was also more rapid than elsewhere in China.

Like Zeng et al., Wang decomposes Sichuan's fertility change into the three components: age structure, change in marital fertility, and changes in age at marriage (see Table 3.7). His analysis shows that, as in the country as a whole, changes in age structure contributed to the rise in fertility in Sichuan. But in Sichuan, 60 percent of the increase in fertility in 1985 and 1986 was caused by an increase in marital fertility. Wang argues that it was a relaxation in the birth

last couple decades, marriage age has taken place in a narrower age range for any one birth cohort.

In their analysis, Wang and Tuma (1993) examine the changing marriage behavior of both women and men in the last 50 years and analyze some of the determinants of those changes. They find very different marriage patterns for males and females in traditional China; women married in a narrow and early range of years, while the age of marriage for men was less concentrated. Marriage was more universal for women than men, with 93 percent of men and 99 percent of women married before age 35. After 1949, there were more similarities between women's and men's marriage behavior and both began to marry within a much narrower age range. The percentage of those married before 35 stayed about the same, but the percentage of those married before 30 went up. With the onset of the late marriage campaigns, new patterns developed, as cohorts experienced not just later marriage but also greater concentration of ages. Currently in China, marriage occurs at the same time for nearly all same-sex members of a birth cohort.

An interesting finding in Wang and Tuma's research has been the way that some of the characteristics associated with differences in marriage age have changed over time. The effects of many social characteristics (e.g. birthplace, level of education, and occupation) have tended to become more pronounced in more recent birth cohorts. Thus even though the age range for marriage has narrowed, social characteristics increasingly differentiate marriage patterns of men and women. They speculate that the timing of entry into marriage was more random in the past, and not connected to particular social characteristics, whereas this timing appears less random today, with schooling and other characteristics influencing marriage age (Wang and Tuma 1993).

The effect of changes in age at marriage on fertility, which was especially important in the 1970s and 1980s, has been the subject of several analyses of fertility change. A discussion of four studies serves to illustrate the contribution of changes in age at marriage to the fertility fluctuations of recent years.

Coale et al. (1991) compare marriage duration total fertility rates (TDFR) with age specific total fertility rates (TAFR) to estimate the effect of changes in nuptiality on fertility. They demonstrate the contribution of a decline in age at marriage in the early 1980s to the upturn in fertility during that time. Because of the marriage boom that occurred after early marriage restrictions were rescinded in 1980, women from older as well as younger cohorts were entering childbearing at the same time, having children, and causing an upward push on fertility rates.

Even if virtually all women marry in China, and even if duration-specific fertility stays the same, changes in age at marriage will affect overall fertility (see Coale 1989). The TAFR will be equal to the TDFR when there is no significant change in marriage behavior, but in times when age at marriage is changing, the ratio of the two measures (TAFR/TDFR) is a measure of the effect of changes in nuptiality on fertility. When the ratio is less than 1.0, fertility is affected in a

especially marriage behavior and aspects of marital fertility. The reasons for such a focus are tied to the ways that fertility has changed in China, in particular changes in age at marriage, and program-induced increases in contraceptive use. (For discussions of other intermediate variables affecting fertility, see Wang et al. 1987. See Tu 1990 on breast-feeding. On abortion use, see Xiao et al. 1995; Wu et al. 1992; Feng and Chen 1983. Gao et al. 1993 discuss premarital sexual activity.)

*Marriage:* Marriage has always been a significant institution in China for its role in strengthening or making new political connections; because it marks the beginning of a new family, or--more accurately--a new generation in an existing family; and because it is recognized at the legitimate start of sexual relations. Changes in marriage behavior in recent years in China are particularly important because these changes have had a fundamental role in fertility decline in China. Social and economic changes have affected marriage behavior, but the Chinese government also saw deliberate encouragement (and later requirement of) late marriage as a way to lower fertility and slow population growth.

As in the past, marriage continues to be nearly universal in China. But one of the most notable aspects of changes in marriage behavior has been at what age married life begins. The average age at marriage for women has risen fairly steadily since the late 1940s (see Figure 3.5. It was 18.2 years in 1940; during the next 25 years, it rose about 0.7 years per decade. Major changes were particularly apparent during the Cultural Revolution in the late 1960s and early 1970s and during the late marriage campaigns in the late 1970s and early 1980s. In the 1960s, the average age at marriage had risen to 19.8; it rose to 23.1 by 1980, then fell to 22.8 in 1981 and 22.7 in 1982 (Caldwell and Srinivasan 1984). In addition to rising, marriage ages have also become more concentrated, with declining standard deviations (Wang and Tuma 1993).

The above are period figures; comparing the experience of different cohorts gives a fuller picture of just how much age at marriage has changed. Coale et al. 1991 present a summary of those changes in their data on first marriage rates by age for four different cohorts (Figure 3.6; see also Wang and Tuma 1993). Those women marrying before government-imposed marriage restrictions (those reaching age 14 in 1964) married at younger ages than later cohorts, and the marriage sequence is fairly smooth. Later cohorts were all subject to government restrictions, and cohort marriage patterns reflect that. For example, for those reaching 14 in 1971, government policy prohibited marriage until age 23, and the lower marriage rates before that age reflect those rules; for this cohort there is a sharp peak at age 23, suggesting a rush to marry as soon as the minimum age was reached. The last cohort (those age 14 in 1974) began their early adult lives under strict control over age at marriage, which accounts for their low marriage rates in young ages. But the peak in this cohort comes at age 21 because government constraints on early marriage eased just at that time. Women in this cohort married at ages 21 to 23, with few marrying before or after this age. Over the course of the

Each of these explanations (and others as well) has some validity and support. There are wide differences in program implementation, especially since the mid 1980s when the central government instructed localities to adapt programs to local needs. But also, China is quite heterogeneous, with important regional differences in a variety of social norms and behaviors and in economic life. Studies focused on some of these contradictions and differences have given us greater insight into these broad changes. These broad macro effects operate through intermediate variables such as marriage, contraceptive use, and abortion. Below, we examine those receiving the most attention in the literature.

### *Explanations for Fertility Change*

With newly available data in hand, demographers have put a great deal of energy into understanding the extent, differentials, and causes of China's enormous decline in fertility. Their efforts have resulted in a large body of research and extensive understanding of the nature of and reasons for fertility change in China, which is especially impressive given the recent beginnings of the study of China's population.

There have been at least two different directions of research attempting to explain recent fertility changes. Much, if not most, of the research in this area has used primarily statistical methods to explore findings and to disentangle relationships. Especially useful have been studies focused on fluctuations in fertility and fertility decline and attempt to find the underlying causes. A second group of studies -- far fewer in number for reasons mentioned above-- focus on small geographical areas or groups of people in order to understand influences on demographic behavior. We begin by discussing the first group of studies, then some of the micro-level investigations.

#### Statistical Explorations

By 1980, demographers and Chinese officials were keeping a close eye on fertility fluctuations. The rise in fertility in the mid 1980s, especially after the sharp declines a few years before, was of concern and interest both to policy makers whose goal was to keep population growth in check, and to demographers who sought explanations and understanding of the fertility increase during those years. A variety of approaches, techniques, and perspectives was sought to explain these fertility fluctuations and to predict both future effects and future changes.

Demographers know that several things, called "intermediate variables" or "proximate determinants" can influence fertility in any population. These variables include age at marriage and proportion of the population married, level of contraceptive use, extent of induced abortion, frequency of intercourse, and lactational infecundability. Research on China's demography--and thus our own discussion of the literature--has focused on a few of these intermediate variables,

were extremely extensive in all educational categories (the smallest fertility decline was 35 percent). The authors argue "This surprising homogeneity in declines of unprecedented magnitude suggests that they are a result of a strong programme effort with common targets in rural areas. We know of no social or economic change that could account for such large and across-the-board changes in such a limited period" (p. 53).

In spite of evidence of the strength of the birth planning program and the weakening effects of social and economic factors, regional, provincial, and local differences in fertility (and mortality as well) remain a part of China's demographic experience. Provincial fertility levels (Figure 3.4) show marked change from one time period to another. But even in the most recent period, one thing stands out clearly: the great variation from one province to another. In 1990, fertility rates ranged from lows of 1.3, 1.6 or 1.5 in the provinces of Beijing, Tianjin, and Liaoning, respectively to highs of 2.7 in Guangxi and 2.9 in Henan. As several scholars have pointed out, these rates are so widely spread that some provinces resemble third world countries with relatively high fertility rates such as Indonesia (2.9) or Brazil (2.8), while the low fertility rates of other Chinese provinces resemble those in societies such as Germany (1.3) or Hungary (1.6).

The variation among counties in China is even greater than that among provinces (Poston and Jia 1990). As the proportion of first births in Table 3.5 shows, even within individual provinces, in 1982, rural areas had markedly different levels of fertility.

What accounts for these continuing regional fertility differences? This is a question which has drawn interest in recent years. In one analysis (Poston and Jia 1990), the differences in fertility among counties were found to be correlated with indicators of socio-economic development. Especially important appeared to be infant mortality; those counties with a low IMR had lower fertility. Although this was true in nearly all areas of China, other socio-economic indicators had even stronger links to fertility levels in some parts of China, and hint at not only some of the great regional variation in fertility but also the differences in underlying causes. For example, the proportion illiterate had the greatest effect in the northern and southwestern parts of China, while in eastern and southern China, agricultural and industrial output per head had the strongest effect on fertility levels.

It may also be that the program is more effective in some areas than in others, because of the effective use of resources or access to more resources. For example, wealthier areas have more resources with which to strengthen their programs, through support for increased personnel or the provision of better incentives. There are also indications that programs are more effective in areas with certain characteristics, such as high levels of education (Poston 1990; Birdsall and Jamison 1983; Tien 1984). Another factor is the strong regional differences across China in aspects of life such as culture, norms, and fertility preferences. Similar programs can have different outcomes depending on where they are being implemented.

among women in the production brigade increased" (p. 52). Thus the education environment had a strong effect on fertility, independent of women's individual levels of education. During that same period, the relationship between individual education and total fertility was not consistently negative, as we would expect. For example, in brigades with 40 percent or higher illiteracy, women with junior high or higher education actually had higher fertility than women with only primary education.

The lower panel of the table shows just how quickly those earlier patterns and associations changed. By 1979-82, the effect of education environment (the macro effect) had disappeared, and there was no longer any consistent relationship between the level of illiteracy at the brigade level and fertility. In addition, the micro-level effect disappeared as well: there was no consistent negative relationship between individual education and fertility.

Peng's (1989) explains such changes in the effects of social and economic factors by suggesting multiple causes:

The gradual increase in regional, and decrease in educational and occupational differentials is mainly a combination of local government efforts in birth control and the population's response to the programme. Although the policy initiative began centrally, the outcome of the family planning programme to a large extent has relied on local accomplishments. At the early stage of the transition, certain social groups, such as better educated and cadres, were more willing to use, and had better access to, birth control services. In addition, urban intellectuals and cadres were the main targets of the early family planning programmes. With the progress of the programme, knowledge and provision of contraceptives became widely available to everyone in a certain location. Therefore the pace of fertility transition was largely determined by local commitment to the programme. As a result, fertility differentials between social strata shrank, while regional differences widened" (p. 23).

Birdsall and Jamison suggest two other factors for the change in the relationship between income and fertility. By the early 1980s, they argue, fertility had fallen to a point "at which rapidly diminishing returns to further improvements in income (and education, employment, etc) have set in" (p. 666). Also important is the fact that the program itself grew in strength and effectiveness, and may have overwhelmed any continuing social or economic effects.

Freedman et al. (1988) argue that their findings of such huge fertility declines in so short a time, across all educational categories, suggests just how effective the program has been. Their discussion of Sichuan's experience illustrates this well (see Table 3.4). In Sichuan, which had a very strong program, fertility declines

began to decline a decade later, in the 1970s (Lavelly 1986).

The urban fertility decline began within three years in all provinces, reaching a 15 percent decline by 1967 in the urban areas of all provinces. But the onset of the fertility decline in rural areas was much more widespread. Fertility decline began in the rural areas of Guangxi, Xinjiang, Jiangxi, and Guizhou more than ten years after it fertility began to fall in the rural areas of the major municipalities (Peng 1991, p. 228).

Another difference between rural and urban areas is the differences in fertility levels of various areas. Whereas regional differences in urban fertility levels were quite small by the late 1970s, the differences among rural areas is much larger. Currently, even as rural rates continue to decline, urban rates are much more similar across regions than are rural fertility rates.

### *Regional Differences*

Several studies have found marked regional differences, both in the way that fertility declined in the 1970s and in current levels. Before fertility began to decline, those regions with higher levels of socio-economic development had higher fertility and fertility decline began earlier in the eastern, more developed provinces (Peng 1989). Birdsall and Jamison (1983) found that in the late 1970s, during the time of some of the biggest fertility declines in China, the level of development across regions of China was associated with differences in fertility levels, in the expected direction: less developed regions had higher fertility, echoing findings has been seen in many other parts of the world. What makes the issue of economic or social "development" interesting in China is what happened with the onset of a very strong government fertility control program.

Over the course of the fertility decline, the influence of economic measures on fertility changed. Early in the decline, the program's effects were not necessarily the overwhelmingly dominant determinant of fertility differentials; even within provinces, income levels also influenced the level of fertility in the late 1970s. However, between 1975 and 1979, individual and community socioeconomic factors became less influential, weakening the negative impact of income on fertility (Peng 1989; Birdsall and Jamison 1983).

One of the most cogent arguments for the changing effects of social or economic factors on fertility in recent years comes from an analysis done by Freedman, Xiao, Li and Lavelly (1988). They examined the relationship between education and fertility in the provinces of Liaoning and Sichuan, looking at both individual and aggregate measures of education. In both provinces, during the period 1973-6, the educational level of the production brigade had an impact on fertility that was independent of the education of the individual woman. Table 3.3 shows that in 1973-6, "the fertility level of rural women at each individual level of education increased monotonically and substantially as the proportion of illiterate

m from .18 in 1970 to 2.1 in 1980) "exceeds by a large margin all cases of contemporary Asian transitions...it is apparently the most rapid transition to controlled fertility ever observed in a large pop, and all the more astounding in a poor, entirely rural population" (Lavelly 1986, p. 423).

### *China's Experience in Perspective*

Just how significant China's fertility experience has been is perhaps best seen by comparing it with those in other societies which have also experienced rapid fertility change in recent decades. Feeney (1994) provides such a perspective in his overview of China's recent population experience. Figure 3.3 compares the fertility declines in various areas, and China's precipitous drop stands out clearly. Feeney estimates that the decline in fertility between the periods 1965-9 and 1980-84 was 3.63 children per woman over 15 years, thus a rate of decline of 0.24 children per woman per year. This rate compares to a median rate of decline for 22 other Asian populations of 0.10 per woman per year, or one child per woman per decade. "At this rate, decline from a roughly typical premodern fertility level of six children per woman to an equally roughly typical modern level of two children per woman would take 40 years. China, with a rate of decline of 0.24 children per woman per year, experienced a decline nearly this large in only 15 years." p. 120

Key to understanding this phenomenal decline is the fact that it took place in a country with a relatively low gross national product (GNP) and a low level of urbanization. In fact, of those countries with a TFR below 2.5 children per woman, China has the lowest GNP and a proportion of population urban second lowest only to Thailand (Liu and Li 1993).

### *Fertility Differentials*

Within the overall fertility decline, there have been important differences in speed, timing of onset, and levels by geographic area, urban/rural residence and other macro-level characteristics. A close examination of these differentials provides much insight into the factors that affect fertility levels in China.

#### *Urban-Rural Differences*

There have been marked differences between rural and urban areas not only in the timing of the fertility decline but in its magnitude as well. As we saw above, fertility declines began in urban areas in the 1960s, but not until the 1970s in the rural areas. Before fertility began to decline, rural fertility was averaged about 12 percent higher than urban fertility (Peng 1991, p. 228). Urban and rural patterns diverged in 1960s when urban fertility decline began; from that time on, urban marital fertility was 30-50 percent less than rural fertility, even after rural rates

remained low. After fairly precipitous fertility declines in the early 1980s, during some of the most restrictive years of the birth planning policy, fertility decline appeared to level off and even rose somewhat during the mid 1980s. The crude birth rate (CBR) fluctuated during this time (see Table 3.2), reaching a peak for the 1980s decade of 23.33 per thousand population in 1987. However, part of the rise in CBRs was due to the changing age structure, with large cohorts moving into the childbearing years. Nevertheless, the TFR, unaffected by the age structure, also rose during the same period, which concerned Chinese officials and demographers alike. But, as we discuss further below, although period fertility did indeed increase during some parts of the 1980s (partly because of a relaxation of the strict one child policy), cohort fertility declined fairly steadily. The period fluctuations in fertility were as much a function of changes in age at childbearing as of numbers of children born.

The late 1980s and early 1990s have also showed distinctive fertility trends. Crude birth rates as well as total fertility rates have declined, but the rate of decline has been much slower than in the early 1980s (Feeney and Yuan 1994). After peaking at 2.59 in 1989, the TFR began to fall again after that.

There is some question about the accuracy of levels of fertility officially recorded in the 1992 survey conducted by the State Family Planning Commission (Feeney and Yuan 1994). Feeney and Yuan use several techniques to evaluate and re-adjust fertility levels during the early 1990s, and argue that total fertility was probably 1.96 rather than the 1.65 reported in the 1992 survey. They conclude that "even the most pessimistic assessment, however, yields the conclusion that China was near, if not below, replacement fertility in the early 1990s" (p. 386). By 1996, China's total fertility rate stood at 1.8 and its crude birth rate at 17 per 1000 (PRB 1996; China Population Today 1996).

The extent and magnitude of the decline is evident in the transition to controlled fertility, as documented by Lavelle (1986). Using measures developed by Coale and Trussell, he examines fertility in rural and urban areas of China in the 1950s and 1960s. His findings (see Figure 3.2) suggest a pattern of natural fertility in both rural and urban areas prior to the early 1960s; although (which measures deviation from a natural fertility pattern) was high (between .4 and .5) before that time, fertility did not seem to be affected by deliberate control. The transition to controlled fertility in urban areas clearly started in 1963, a year or so following an urban-based birth control campaign. The speed of decline is indicated by the rise in  $m$  between 1963 and 1970, when it rose from .5 to 1.6 (in Denmark, such an increase in  $m$  occurred over the course of 70 years, between 1900 and 1970). Fertility control further increased in the early 1970s, with the Wan Xi Shao campaign, and increased further through 1981.

As impressive as these figures are in urban areas, rural areas went through the transition from natural to controlled fertility even more rapidly. In those areas, measures of fertility control showed small increases in 1960s, with rapid transition beginning in 1971. The rate of transition to controlled fertility (reflected in a rise of

### 3. FERTILITY

China's most remarkable and discussed demographic change, of course, is the fertility decline of the last several decades. This decline is particularly notable because it occurred throughout China's very large population and in a society ranked low on most development scales. Here we will sketch China's recent fertility history, leaving explanations and more detailed discussions about the composition of the decline for later in the paper.

#### *History of Fertility Decline*

There is some debate about the level of fertility in prerevolutionary China. Data before the late 1970s are scarce; some of the most important studies of early Chinese fertility have relied on the Chinese Farm Survey of the late 1920s and early 1930s to estimate fertility levels for the country. Several demographers have argued that fertility at that time was moderate, and not as high as had at first been thought (Barclay, et al. 1976; Coale 1984). Arthur Wolf (1984) has challenged their conclusions, and claims that their analyses and assumptions underestimate both fertility and mortality. But whatever baseline level is used as the start of fertility change, no one can dispute the magnitude and speed of the decline in recent years.

Figure 3.1 and Table 3.1 depicts the fertility experience of China over the last 50 years. Before the start of China's fertility decline in the 1950s and 1960s, fertility levels were similar to other developing countries. The two extreme dips in fertility, in 1959 to 1961 and in 1967, reflect the disastrous demographic consequences of the Great Leap Forward and the less severe but significant disruption of the Cultural Revolution.

From 1965-9 to 1980-4, a span of only fifteen years, total fertility fell from around 5.99 children per woman to 2.36. During that period and in later years as well, there were many fluctuations in fertility rates. Some of these periodic changes are connected to the birth planning programs and the timing of particular campaigns but, as we will discuss below, there were other causes operating as well.

During the early period of fertility transition, 1963-1972, fertility was high, but had begun its decline, especially in urban areas. In the 1970s, fertility decline was particularly steep throughout the country, at least partly because of the Wan, Xi, Shao (later marriage, longer birth intervals, fewer births) population control campaign in place during most of that time.

The 1980s were distinctive for the different and sometimes contradictory influences of that decade; the One Child Policy put into place in 1979-1980, the economic reforms of the early 1980s, and the continuing social and economic changes taking place throughout the country during those years were responsible for many of the fluctuations seen in the fertility rates, although fertility rates

Since girls normally have higher chances of survival than boys at these ages, these higher mortality rates likely reflect discriminatory practices against girl children. Such an assertion is supported by Ren's finding that during the first five years of life, females are higher risk of death from causes such as injury, poisoning, accidents and malnutrition as well as from respiratory system and infectious diseases. Preference for sons and sex discrimination is apparent not only at birth but in childhood as well.

Choe, Hao and Wang (1995) also found higher-than-normal levels of mortality among girls aged 1 to 5. The influence of sibling order and number is indicated by their finding that girls with older brothers and sisters have an especially high risk of death. Their finding that this discrimination against girl children "is more or less uniform across families with different socioeconomic characteristics" (p. 62) is particularly troubling; it suggests that changing such practices of discrimination, discrimination which threaten the very lives of girls, will not be achieved through raising education levels or increasing access to health care, as some had predicted. That these practices are so widespread suggests just how embedded gender inequality is in China today.

China has achieved remarkable success in lower mortality rates and raising life expectancies. As in other countries with the kinds of low levels China now experiences, there is currently less concern about the overall levels than there is about differential mortality. The differences among provinces, between rural and urban areas and between males and females are some of the areas that still deserve both research and policy attention.

family and society in the two areas; women in Shanghai are more likely to be employed, are more highly educated, and are less likely to come have rural backgrounds. These factors might mean that mothers in Shanghai have more say in their children's health and are better able to intervene in their medical care.

Infant mortality has declined across all social and economic groups (see Table 2.5), but since the mid 1970s, it has declined further in some groups than in others. Especially notable were the declines seen among those whose mothers were illiterate and among peasants. In rural areas, declines among males were steeper than those among females during these years (Weng and Wang 1993; Gu 1994).

In recent years, especially since the most restrictive birth planning policies were put into place, differential mortality by sex has been an important and controversial issue. In addition to the skewed sex ratios at birth, which imply higher female mortality in the very youngest Chinese (an issue which we will address more fully below, in our discussion of the birth planning policies), there is evidence of differential treatment in the higher mortality rates for girls than boys at ages 1 through 4 as well (see Table 2.2). Coale and Banister (1994) found evidence of excess female mortality at most ages for nearly all cohorts since those born in the late 1930s; in most of the cohorts, the shortage of females is first seen whenever they are first enumerated in census, and after that the sex ratio barely changes, indicating that excess female loss occurs early in life.

Ren's analysis of sex differences in infant and child mortality in three Chinese provinces is important in the way that it has illuminated both the extent of the excess female mortality and some of the factors associated with that mortality. Using data from the 1985 and 1987 In-depth Fertility Surveys for the provinces of Shaanxi, Liaoning, and Guangdong, he distinguished neonatal, later infant, and early childhood mortality (see Table 2.6). Mortality ratios (male rates divided by female rates) for neonatal and infant mortality were within the normal range of 1.22-1.33. Fairly egalitarian breastfeeding of female and male infants may allow female infants high survival chances during their first year of life (but Greenhalgh and Li 1995 found that since implementation of stringent birth planning policies in rural Shaanxi, female infants were breastfed for shorter periods than were males). Further analysis, however, that neonatal mortality risks are especially high for higher order births, and particularly so for girls; whereas the odds of surviving the neonatal period for boys of fourth and higher order are 63 percent of that of first born boys, for higher order girls, survival odds are only 41 percent of girls born first. And the bottom panel of Table 2.6 indicates a worrisome trend: survival ratios have declined since implementation of the One-Child Policy, and since the late 1970s, female infants have experienced higher than expected mortality. Analysis using 1990 census data indicates that male infant mortality has declined during the 1980s (by 3.34 per thousand points) while female infant mortality rose (by 3.53 per thousand points) during the same period (Gao et al., reported in Gu 1994).

Ren also found that the sex ratio of early child mortality rates, at 0.90, is below the normal range of 1.11 to 1.24, indicating increased risk of mortality for girls.

decreased in proportion to neonatal mortality, as preventable and curable diseases began to be less important than genetic problems or illnesses associated with birth that are more likely to occur to neonates. China continues campaigns against infectious diseases likely to strike children; wide immunization programs have reduced (although not eliminated) the effects of encephalitis, meningitis, and hepatitis. In addition, improvements in water quality, especially in rural areas (Banister 1992), have helped to prevent intestinal diseases such as diarrhea, typhoid and cholera among all members of the population, including children who are particularly vulnerable to these illnesses.

Some of the social and economic changes induced by the state also contributed to lower child mortality during the last 50 years (Greenhalgh 1994b). Particularly key have been changes within families which changed the social environments for children. Among the many changes that were likely to reduce child mortality were: the break up of traditional families, which lessened the strength of the age and gender hierarchies prevailing in families before 1949, giving new and greater resources to both young people and women; the removal of many decisions about reproduction and health from the hands of family elders; changes in women's lives that gave them alternative activities and resources, perhaps giving them a voice in household and child decisions, and in general making reproduction less central to women's lives; and a rise in age at marriage, which meant fewer births to very young mothers. The birth planning program also contributed to lowering child mortality; births were likely to be spaced further apart, giving mothers more time to recover from pregnancy and more time with each child. Especially important may be the fact that as the number of births was restricted by the government, the value to parents of each child rose, making it more likely that the child would receive as much food, time and other resources as possible.

There are still significant differentials in infant mortality across China. Tu's (1990b) finding of the important effects of demographic factors such as birth intervals, mother's age at childbearing, and infants' birthweight on infant mortality rates is similar to that found in other societies. In addition, socio-economic factors clearly play a role, at both the macro and micro levels. Poston (1996) found that population density seems to be a good predictor of low infant mortality, with IMRs positively associated with population density; in places of high population density there are likely to be more and better health services and better public health systems. But even among well-educated urban residents, infant mortality remains higher than that found in more industrial countries (Weng and Wang 1993).

Tu (1990b), examining both infant and child mortality, found that the effect of some key factors, such as parents' level of education, has varying effects depending on region. In Shanghai, mothers' education had more effect on child mortality than did fathers' education, but such a relationship was not found in Shaanxi. On the other hand, fathers' education was negatively associated with child mortality in Shaanxi but had no relationship to child mortality in Shanghai. This difference might be related to the different positions that women hold in the

infant deaths, but disagree about the extent of that under-reporting. The levels of infant mortality used and the estimates of under-reporting, of course, make a difference not only in the rates of infant mortality but may suggest adjustments to fertility levels as well (Banister 1992; Gu and Xu 1994).

Many have argued that the official infant mortality rates in the past and in more recent years as well are seriously underestimated. Banister (1987) discusses the possibility of rates as low as those officially recorded, taking into account rates in other parts of the world and characteristics of China that might influence the rates and concludes that most of the official rates in the last 50 years too low. A group of Chinese demographers used a survey specifically designed to measure infant mortality and asserted that infant mortality rates based on the 1982 census are underestimated by about 4 percent for urban areas and 44 percent for rural areas (Zhou 1989, cited in Poston 1996). Especially problematic are neonatal (under one month) mortality rates; for example, one study done in Shanghai in the early 1970s found that half of the neonatal deaths had not been reported (Dong 1982, reported in Banister 1987). Because parents are responsible for reporting both a birth and a death, if a child dies in the first month, parents may be too preoccupied to report the events, not understand the importance of reporting both events, or be reluctant to register the death and lose the extra grain, food and cloth rations that had been given for the extra member of the household.

Thus, serious under-reporting of infant deaths (and differentials in this underreporting by geographic area) makes it difficult to ascertain exact levels. Table 2.3 presents official infant mortality rates for selected years from the decades since 1949. There have been many attempts to adjust reported rates to ascertain more accurate rates. Indirect estimates of rates and their reference dates, based on data from the 1982 census and 1982 fertility survey (considered more reliable than those from the population registers) are presented in Table 2.4. A reference point for infant mortality in rural areas is the relatively complete statistics gathered in the Chengdu (Sichuan) suburb of Shuangliu. Infant mortality during the mid 1970s there was measured (via a mortality survey) at 71.93 per thousand live births (cited in Banister 1987). In a recent analysis of infant mortality levels by county using 1982 data, Poston (1996) argues for a relatively conservative adjustment of removing from the analysis those counties with rates that are obviously too low: that is, urban counties with rates less than 15 (Beijing's IMR) and rural counties reporting rates under 28 (the rate of Rudong, a model rural county in Jiangsu).

Despite the disagreements over the exact past and even present levels, there is agreement about the extent and breadth of decline in infant mortality. Infant and child death rates declined steadily through the late 1970s and more slowly through the 1980s; the 1996 infant mortality rate of 44 (PRB 1996) is only slightly lower than those of the early 1980s.

Especially steep have been declines in post-neonatal and child mortality, resembling patterns observed in other countries passing through the epidemiology transition. In the 1950s and 1960s post-neonatal and early childhood death rates

medical care less widely available might negatively affect mortality levels, data from the 1990 census do not indicate that mortality has been affected by these changes (Banister 1994).

### *Mortality Differentials*

#### Regional differences

China experiences mortality differentials in the expected directions. Mortality is higher in rural areas; in fact the further the distance from an urban area, the higher the mortality rates (Men 1993). In urban areas, causes of death tend to be those seen in highly industrialized countries, such as malignant tumors and diseases of the cardiovascular system. In rural areas, there is higher incidence of diseases related to poor living conditions and inadequate medical support; malnutrition, preventable and curable diseases of infancy and gynecological diseases are much more common. Respiratory diseases cause 16 percent of deaths in urban areas but over 25 percent in rural, where it is the leading cause of death. Cerebrovascular diseases, the leading cause of death in urban areas causes 22 percent of deaths in urban but only 16 percent in rural. In general, an area's mortality rate is closely and negatively related to its per capita GNP, per capita industrial and agricultural output, and rural households' per capita net income (Men 1993); such findings suggest the continuing effect of social and economic differences on mortality differentials.

#### Age differentials

*Adult:* Rates of declines in mortality in recent years have differed for Chinese of different ages (see Table 2.2). For young adults (15-19 and 20-24), only small improvements in mortality were seen since the mid 1970s. Mortality was already low for this group by the mid 1970s, making further gains more difficult. And the main causes of death, such as accidents, have not been much reduced since then.

For adults, women have made more rapid gains in mortality in the last twenty years than have men. Banister (1992) suggests that the reasons for the difference lie in two directions. Maternal mortality risk were reduced as fertility declined and modern contraception was increasingly available. Also significant are the increased health risks men are now facing through occupational hazards and from increases in cigarette smoking.

Among the elderly, mortality declines have not changed much since the mid 1970s. Chronic diseases, which are prevalent among this group, are not easily addressed through health improvements, and China does not have the extensive resources needed to deal with such diseases.

*Infant and child mortality:* Infant mortality has declined in ways similar to general mortality, but there is even more disagreement among demographers about past and current levels. Here again, most agree that there has been under-reporting of

affected even more strongly, rising 60 percent in 1958; it declined somewhat in the second year, declined to pre-crisis levels in 1960, then rose sharply in 1961, finally settling into pre-crisis levels in 1962. Adult mortality began to rise more slowly than infant deaths, but reached extremely high levels in 1960, falling back to pre-crisis levels by the next year.

Peng's examination of regional experiences points out both how widespread the crisis was and the ways that some areas (such as central China) were harder hit than others. His discussion of the underlying causes for the famine makes clear just how large a role misguided state policies played in causing and perpetuating the crisis. Although natural disasters played some role, mistakes on the part of the government were even more important. Much of the decline in grain output that occurred during those years was due to state attempts to increase industrial output. The government also began to increase its grain procurement in order to supply non-agricultural laborers, aggravating food shortages in rural areas. Exaggerations of achievements and lack of knowledge of the extent of the crisis led to a slow government response to the crisis. Peng concludes that "the demographic crisis during the Great Leap period was mainly caused by erroneous government policy decisions (on top of natural disasters), as well as by hastily introduced institutional changes and innovations for which China was ill prepared" (p. 666). His analysis adds further evidence to a body of literature that has detailed how famines, even ones of this size, can occur for reasons other than lack of food and, with Ashton et al.'s work, illustrates the use of demographic data to reconstruct the demographic, social and political past.

After the disasters of the Great Leap Forward, China's mortality rate continued its steady but rapid decline. By the end of the 1970s, the crude death rate had reached 6 to 7 per 1000, and it has remained at about that level since then. Life expectancies also made large gains in the same years, rising from 35 years in 1949 to nearly 55 for 1963, to 63 years in 1973, and to nearly 65 by 1980 (Wu 1991, p. 41). Today, life expectancy at birth has reached 70 years (PRB 1996).

With the decline in mortality has come a characteristic change in disease patterns. Whereas respiratory diseases accounted for nearly 17 percent of the deaths in 1957, by 1982, these made up only 8.7 percent. Nearly 8 percent of deaths in 1957 were caused by acute infectious diseases, but these were the cause of only 2.5 percent of deaths in 1982. On the other hand, as in other countries with low mortality, cerebrovascular and heart diseases caused 43.3 of the deaths in 1982, up from just 12 percent in 1952 (Liu 1986). In the intervening years, China has developed an extensive health system and has developed technology to prevent and/or cure many infectious diseases. Immunization coverage is quite extensive; in 1990, 98 percent of the population had been immunized against both polio and measles (Grant 1992). In addition to these medical and technical advances, China has experienced the kind of rise in living standards that supports lower morbidity and mortality. Although some demographers and public health workers have been concerned that recent economic reforms which have made

By 1957, the crude death and infant mortality rates were about half what they had been in 1947 (Banister 1987: 83). Crude death rates declined from 25.5 per thousand in 1953 to 8.9 in 1970, and further to 7.3 in 1981 (Coale 1984); official statistics estimate the crude death rate as 6.78 in 1985 and 6.64 by 1992 (State Statistical Bureau 1994). Age specific mortality rates (see Figure 2.1) fell in a similar fashion; especially noticeable are declines for those in the youngest age groups.

Some of the reasons for the decline in mortality in the 1950s and 1960s were similar to those in other societies that have also experienced declines. After 1949, the new government began to maintain public order, warfare ceased in most areas, there was much less social, economic and political instability, and people were able to farm and carry out other daily activities without interruption. Redistribution of land and wealth was a factor, especially for the poorest citizens. The government also began to purchase, store and distribute grain to alleviate local famines.

The government also began to develop massive public health programs, focusing on the prevention of disease. These included the training midwives in modern techniques, attention to some of the most serious of infectious diseases such as smallpox and typhus, and "patriotic health campaigns" in which citizens would spend two weeks a year cleaning up the environment where diseases were often bred. It would be another decade before China was able to provide extensive technical and medical preventive and curative solutions to its citizens' health problems, but these early (and relatively inexpensive) efforts went far in reducing many diseases. China's progress in reducing mortality during these decades was impressive, given the high rates at the start of the period, and the lack of resources available to the government.

The Famine of the Great Leap Forward: However, the end of the 1950s brought widespread famine to China. Detailed information on the events of 1958-1961 has been available only since the 1980s, when the Chinese government released relevant data and demographers applied modern statistical techniques to reconstruct past events. We now know that during that time, following the Great Leap Forward, a failed movement aimed at increasing agricultural and industrial production, China suffered one of the largest famines in human history, in which nearly 30 million people suffered premature death. Recent analyses (Ashton et al. 1984; Peng 1987) are particularly interesting in illuminating the demographic events of the period and in suggesting ways that demographic techniques can be used to reconstruct the past. Both used a variety of demographic sources, including the 1982 census, the 1982 One-per-Thousand Survey and registration figures, to estimate the timing and amount of excess mortality and the drop in fertility that occurred during that period between 1958 and 1961. Ashton et al. found that the effect of the crisis on fertility increased during the years from 1958 to 1960; fertility fell 15 percent the first year, a further 15 percent in 1959 and over 20 percent in 1960, after which fertility began to rise to pre-crisis levels. Infant mortality was

## 2. MORTALITY

### *Data*

Accurate mortality statistics have not always been available in China, even in recent years. Before 1982, the only widely usable data were crude rates from the vital registration system and life tables of 1973-75 based on the Cancer Epidemiology Survey of 1976. With the release of statistics from earlier periods and with the beginning of large scale data collection efforts, this situation began to change in the early 1980s. But the quality of mortality data remains an issue even today. In the 1990 census, for example, there were more problems in mortality reporting than in the 1982 census or earlier mortality survey of mid 1970s. The 1990 census asked about deaths in each household for the first half of 1989, the second half of 1989 and the first half of 1990; data from the first two periods were particularly questionable. Underreporting of mortality was probably about 15 percent in 1989 and 3 percent in 1990 (Zhang and Cui 1994). Several scholars (Banister 1994; Zhang and Cui 1994) have concluded that mortality for the elderly is underreported. Other problems include problems with infant mortality coverage (Banister 1994; Tu and Liang, 1994), even in the last decade and in the 1990 census; Tu and Liang estimate the level of underreporting of infant deaths in the 1990 census as 22.1%, with a higher proportion of female than male infant deaths not reported (Tu and Liang, 1994).

Detailed analyses of China's mortality experience in the early years after the founding of the People's Republic have been hampered by both lack of data and questions about the quality of the data that do exist. Demographers working in this area are in agreement that mortality rates and levels have been underestimated, especially during the 1950s and 1960s, but disagree on the extent of the undercount, especially at the beginning of that period (Banister 1987; Coale 1984; Liu 1986). With the collection and later release of census data in 1953, 1964, and especially 1982, life tables could be calculated and mortality levels and rates re-estimated and adjusted accordingly. Table 2.1 presents two sets of crude death rates: the official rates and those Coale has calculated after adjusting for undercount; he estimated that only 55 percent of actual deaths were officially recorded in the 1953-56 period and 84 percent in 1964. The differences in these estimates are especially large for the earliest years. If the higher death rates are assumed, the mortality decline during the 1950s and 1960s is even more impressive than the official estimates indicate.

### *Mortality Decline*

From whatever starting point, death rates fell sharply during the 1950s and 1960s.

was in place from 1949 to 1978 prevented the development of these fields in China and the government all but banned foreign researchers from doing such research as well. This situation has begun to change in recent years, both as demographers employ new methods and as the Chinese government has begun to allow Chinese and foreign scholars to do ethnographic research.

## Data Quality

Given both the size of China's population and the recent beginnings of these large scale data collections, the quality of data has been surprisingly good (see Coale's (1984) extensive discussions on data quality in the 1982 census and fertility survey and Banister 1987, Chapter 2 for a broader discussion of Chinese data quality). After a decade and a half of data collection and extensive analysis, evaluation of the data collections, especially the early ones, has been extensive. For example, the 1990 census not only provided demographers with important data for monitoring population dynamics, but also allowed further evaluation of the 1982 census. Other evaluative checks have been conducted through post-enumeration surveys after the census and through comparisons with data regularly collected through household registration.

The 1990 census data quality was of high quality, passing internal consistency checks as well as showing consistency with the 1982 census and fertility surveys. Age reporting has been consistently good in all data collections (Zhang and Cui 1994), partly because Chinese citizens usually know their correct age and because Chinese statisticians have done an excellent job in transforming Chinese birth dates and ages into equivalent ages in the western calendar (Banister, 1994).

Accurate mortality statistics have not been as easy to find. In the 1990 census, for example, there were more problems in mortality reporting than in the 1982 census or the mortality survey of the mid-1970s. The 1990 census asked about deaths in each household for first half of 1989, second half of 1989 and first half of 1990; particularly questionable were data from the first two periods. Underreporting of mortality was probably 15 percent in 1989 and 3 percent in 1990 (Zhang and Cui 1994).

Several scholars (Banister 1994; Zhang and Cui 1994) have concluded that mortality for the elderly is underreported. Other problems in mortality data include the evidence that female infant mortality has been underreported during the 1980s and in the 1990 census (Banister, 1994; Tu and Liang, 1994).

## Missing Pieces

Certain aspects of China's population have not received much attention. Especially noticeable is the relative dearth of in-depth research on the ways that population changes or the effects of those changes at the micro level. Here we see the influences of both the shape of the field of demography and the particular difficulties of doing research in China. Demography tends to focus on the large scale, and, in fact, that is where the Chinese government has put most of its resources. That interest and focus is understandable, given the lack of good demographic statistics in China until the advent of recent population surveys and censuses.

In addition, the Chinese government has for years discouraged the kind of research that would involve ethnographic methods or researchers spending long periods of time in one locality; the outright ban on anthropology and sociology that

Demographic studies of China really began in earnest in the early 1980s. Appropriate data became available just as demographers were seeking to document and describe the fertility changes that took place in the 1970s and early 1980s. By all standards, the early and mid-1980s were a time of enormous social, economic and demographic change, including the re-organization of peasant communities and household economies, the privatization of many rural and urban enterprises, increased contact with the outside world and widely implemented and stringent population planning policies.

In 1982, an extensive program of large-scale data collection of good quality began and has continued through the present. In 1982, China conducted both a census and a National Fertility Survey. In addition, around this time, the government began to release data from past collection efforts. These events began "a rising flood of quantitative and qualitative information that threatens to swamp specialists in China's population" (Banister 1987, p. 19). Since then, there have been many population surveys undertaken, including (but certainly not limited to) the In-depth Fertility Surveys conducted in 1985 and 1987, the One-percent Survey (intercensal) in 1987, the Two-per-Thousand Fertility Survey in 1988, the 1992 Baseline Survey conducted by the State Family Planning Commission, and the most recent 1995 One-percent Survey.

These and other data sets have provided demographers with detailed information on the changes in China's population; they have been used in a variety of ways, including: to evaluate the quality of earlier survey data, to document fertility dynamics of the 1970s and 1980s, to discuss the causal effects of the great social changes taking place during that time, and to provide some predictions for further population change.

#### Development of demography in China

Also important to our understanding of population dynamics of China was the development of the field of demography in China and an increasing involvement of Chinese demographers in both data collection and policy development. Beginning in the late 1970s, after a period of 20 years of uncertainty and instability, demography as a field began to take on professional status in China, supported by the government. In 1974, the first Department of Population opened in 1974 at People's University. By 1978, there were 22 centers for demographic research and training, and the number of such institutions has grown since then (Greenhalgh 1992).

In the early days of Chinese demography, there were few scholars who had had appropriate or extensive training in the necessary fields. That has now changed; many scholars have received training in institutions overseas, there are continuing exchanges and collaboration between demographers in China and other countries, and Chinese institutions are now training scholars within the country in programs at the undergraduate, masters and doctorate levels.

only briefly, not because of their unimportance but because of space and time considerations. Primary among these is research on migration and mobility. Although never insignificant, this field has become increasingly important. Mobility and migration levels (especially rural-to-urban) have risen in recent years in China, especially since the economic reforms of the 1980s and so too has the amount of research on migration<sup>1</sup>. That there have been several major conferences on migration in China in the last few years is a reflection of the general interest in this area of work.

We also do not discuss in detail the literature on birth planning program implementation nor on contraceptive use and methods. Although we mention some of the work in this area, there is much more available that we cannot address<sup>2</sup>. Finally, another research area receiving increasing attention is that involving China's minority groups<sup>3</sup>. We touch on some of this work, but limit ourselves to that directly related to other topics we are covering, such as fertility or mortality differentials.

Finally, we should make clear that we are relying on other scholars' work in this piece. Rather than trying to develop new analyses, we have instead tried to evaluate what others have written, and to highlight some of the most important, informative, and even controversial pieces on the subject of China's population.<sup>4</sup>

### *Studying China's Population: Sources and Background*

#### Data

Early data collection was limited, and what was known about the population came from two national censuses done in 1953 and 1964, and a few surveys, including the Farm Survey of the late 1920s and early 1930s and the Cancer Epidemiology Survey of 1976, and selected registration data, which was often of questionable quality.<sup>5</sup>

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<sup>1</sup> For example, see Liang and White 1996; Ebanks and Cheng 1990; Goldstein 1990; Goldstein, Goldstein and Gua 1991; Gui and Liu 1992; Li 1989; Yang 1994.

<sup>2</sup> Some examples include: Kaufman et al. 1989; Kaufman 1993; Li et al. 1994; Poston 1986; Tu 1995; and Yang 1994. See especially Chen and Kohls 1982.

<sup>3</sup> See Gladney 1991; Anderson and Silver 1995; Park and Han 1990; Poston and Chu 1987; and Yusuf and Byrnes 1994.

<sup>4</sup> There have been many monograph-length treatments and collections of articles of China's population situation published in recent years. We rely on many of these throughout this work, but do not focus on them. These include Banister 1987; Kane 1987; Coale 1984; Croll et al. 1985; Peng 1991; Poston and Yaukey 1992; Goldstein and Wang 1996; Tien 1991; and Wu 1991.

<sup>5</sup> The intense interest on the part of the world's demographers for good Chinese population data is reflected in the ways that prior to the early 1980s, they were willing to comb through scattered reports and occasional references to population statistics. An example of such estimation based on disparate sources is Coale (1981) in which he gathers as much information as possible and makes a noble attempt to construct a picture of population in China at that time.

how mortality and especially fertility changes have affected the age structures of the population.

Also significant to understanding population dynamics in China is that much of China's fertility decline can be attributed to the very strong Chinese birth planning program. The world has been watching China's demographic experience partly because of the enormous impact any change there makes on world population figures. And among those working in the field of population, China's fertility decline has fueled speculation about whether such a decline can be sustained and whether the techniques used to bring down fertility in China can be exported to other countries experiencing rapid population growth.

### *Goals and Limitations*

This paper reviews research on population dynamics in China in the last fifty years, examining changes and differentials in mortality and fertility, both at a national level and at provincial and local levels, as data availability allows. After first setting out the general trends, we discuss how these trends have been interpreted by scholars working on China's demography. We then turn to an issue which has captured the interests of many: the role of the state birth planning program in the demographic changes that have occurred in China. We will highlight key pieces of research in order to illuminate the very controversial and often divisive perspectives on this subject. Finally, we discuss some of the consequences of the recent population changes, such as population ageing and changing family structure, with an eye toward what we might expect in the future.

We are by no means able to cover research on Chinese demography completely; the literature is enormous and continues to grow rapidly, and we have had to restrict our discussion in several ways. First, we are limiting our discussion to the English language literature, and primarily look at published sources (the exceptions are a few sources that have provided information on extremely recent population changes). Limiting the review to that published in English means that we will not touch the burgeoning demographic literature published only in Chinese. We therefore inevitably miss some population analyses done and published only in China. But perhaps even more seriously, although we are including many pieces of research by Chinese demographers published in English, this limitation introduces a potential western bias in the perspective of the literature we are including. We have made efforts to take into account that bias, but we have to acknowledge it.

In addition, we emphasize the most recent research which presents the most recent population situation. The release of and access to Chinese demographic data has steadily increased (as has available data itself), providing more and more data for demographers to use to describe both the present demographic situation and that of the past as well.

There are a few areas of demographic research that we do not cover, or touch

## 1. INTRODUCTION

At 1,217,600 (Population Reference Bureau 1996), China's population comprises about one-fifth of the world's total population. For that reason alone, interest in the size and changes in the population of China has been heavy and sustained; even small changes in a population of that size can have dramatic effects on the rest of the world.

Although China's population occupies a large portion of the world's total population, its land area is proportionally much smaller, only seven percent of the world's total land area, about the size of Canada (where about 30 million people live). China's population density of 121 persons per square kilometer is one of the highest in the world, three times the world average. But the seriousness of its population density is made even more so by the additional factor that 94 percent of the population lives in only 46 percent of its land area, mostly in the eastern and southeastern parts of the country (see Figure 1.1). The western and northwestern parts of China are less habitable because of deserts, mountains, and a scarcity of water. In addition, China's per capita natural resources are not abundant (see Figure 1.2), causing some to voice concerns about resource depletion.

China's demographic situation has also drawn interest because of the dramatic changes in population that have occurred there in very recent decades. About two-thirds of the increase in population--about 900 million people--since the year 1900 happened in the last fifty years, primarily as a result of a rapid decline in mortality rates while fertility rates remained high.

In the last two decades, changes in China's birth rates have assumed primary focus. China has had the most rapid sustained fertility decline ever seen in a population of any size; in a fifteen year period beginning in 1965-9, the total fertility rate fell from 5.99 children per woman to 2.36 by the first part of the 1980s. It dropped still further in the last decade, and in 1996 stands at 1.8 (PRB 1996).

Of course, with such rapid declines in mortality and then fertility, rates of natural increase (RNI) were likewise affected. The RNI stood at about 2.0 percent in 1950, rose to 2.3 by 1957 and, after mortality declined, rose to over 3.3 in 1963. With the onset of the fertility decline, the RNI declined, dropping to nearly 2.6 percent by 1970, 1.6 by 1975, and close to 1.2 in 1992 (State Statistical Bureau 1994). In 1996, the rate of natural increase was 1.1 percent (PRB 1996).

Some suggestion of the enormous effects of such a rapid fertility decline comes from a comparison of population pyramids for several years (see Figures 1.3 through 1.6). We will discuss the consequences of age structure, including the ageing of the population, later in the paper. Here we point out the obvious impact of the large birth cohorts of the 1950s and 1960s; by 1987, the 1964 birth cohort had entered the reproductive ages and accounts for a large proportion of the higher birth rates of the mid 1980s. The changes across time in the pyramids reflects just



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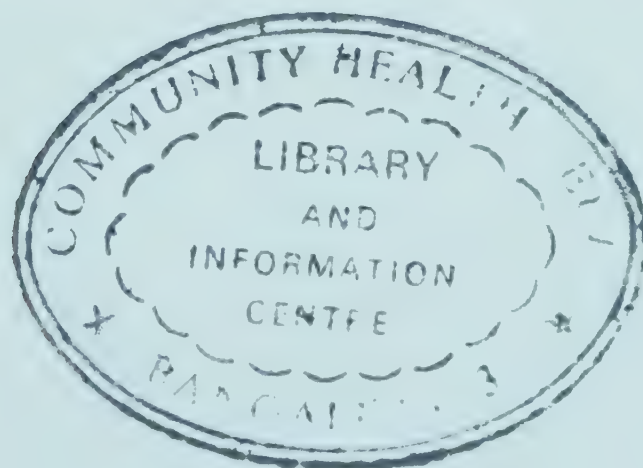


# **China's Population: A Review of the Literature**

**Nancy Riley**  
Bodwain College

and

**Robert W. Gardner**  
Harvard University School of Public Health







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